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REPORT OF PROCEEDINGS

OF THE

SIXTH ANNUAL SESSION

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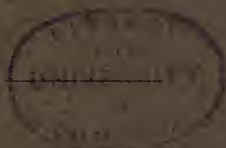
THE AMERICAN MINING  
CONGRESS

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IRWIN MAHON, SECRETARY,  
CARLISLE, PENNSYLVANIA

DEADWOOD AND LEAD, SOUTH DAKOTA

SEPTEMBER 7, 8, 9, 10 11, AND 12, 1903



1904 :  
UNION PRINTING COMPANY,  
PORTLAND, ORE.











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## SESSIONS OF THE CONGRESS HAVE BEEN HELD AS FOLLOWS:

	DATE	CITY	PRESIDENT	ADDRESS	REMARKS
1st	July 1897	Denver, Colo.	Hon. Alva Adams	Pueblo, Colo.	Temporary
1st	July 1897	Denver, Colo.	Hon. L. Bradford Prince	Santa Fe, N. M.	
2nd	July 1898	Salt Lake, Utah	Hon. L. Bradford Prince	Santa Fe, N. M.	
3rd	July 1899	Milwaukee	Col. M. B. Montgomery	Cripple Creek, Colo. }	Passed to June 1900
3rd	June 1900	Milwaukee	Col. M. B. Montgomery	Cripple Creek, Colo. }	
4th	July 1901	Boise, Idaho	Hon. L. Bradford Prince	Santa Fe, N. M.	
5th	Sept. 1902	Butte, Mont.	E. L. Schafner	Cleveland, Ohio.	
6th	Sept. 1903	Deadwood and Lead S. D. }	Hon. J. H. Richards	Boise, Idaho.	



OFFICAL ROSTER

OF THE OFFICERS OF THE

American Mining Congress

SEVENTH ANNUAL SESSION

MEETS AT PORTLAND, OREGON,

AUGUST 22 - 27, 1904.

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**American Mining Congress**

WHICH MET AT  
DEADWOOD AND LEAD, SOUTH, DAKOTA,  
SEPTEMBER 7 TO 12 INCLUSIVE, 1903.

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REPORT OF PROCEEDINGS  
OF THE  
SIXTH ANNUAL SESSION  
THE AMERICAN MINING  
CONGRESS

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DEADWOOD AND LEAD, SOUTH DAKOTA,

SEPTEMBER 7, 8, 9, 10, 11 AND 12, 1903.

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Deadwood, S. D., September 8, 1903, 10 A. M.

PRESIDENT RICHARDS: The Congress will now be in order. During this forenoon session we will pay no attention to the cards representing the states. We will be pleased to have you all come forward and these seats will be arranged for the afternoon.

PRESIDENT RICHARDS: We will now have the invocation by The Right Reverend John Stahra, Bishop of Lead.

BISHOP STAHRA: In the name of the Father, Son and the Holy Ghost amen: O, Holy Father, Almighty and Eternal God, we at all times and on all occasions praise and adore Thee for the many benefits Thou hast bestowed upon this great republic. Today, therefore, we raise our hearts and our voices beseeching Thee to bear forth Thy graces on these assembled. We pray Thee in Thy bounty to share Thy blessings on all the members of this American Mining Congress, and especially ask thy blessings on all those who are to take part in the deliberations of this Congress, that the officers and delegates may be strengthened by Thy grace and may discharge their duties honestly and conscientiously and for the well being of the people. May the deliberations of this Mining Congress be guided by the light of Thy divine wisdom, may its deliberations tend to promote the mining industry, the prosperity of our nation and the spiritual and temporal benefit of the people.

We pray Thee on this great auspicious day, O God of Nations and of Battles, to direct in Thy wisdom our National Congress to frame laws for the development of the mining industry, and we pray Thee that it may become a separate department of our national government. We commend to Thy infinite bounty all our fellow citizens throughout the United States and the officers and delegates of this Mining Congress that they may live in union and brotherly love and, after enjoying all the blessings of this life they may by Thy divine grace be permitted to enjoy eternal life with Thee forever in Heaven. Amen.

PRESIDENT RICHARDS: You will now listen to the address of welcome on behalf of South Dakota by the governor of this state, Hon. Charles N. Herreid. (Applause.)

Mr. President and Members of the American Mining Congress: Today South Dakota enjoys the proud distinction of having as her guests the representative men of one of the most important industries, and it gives me great pleasure to welcome to our state this large and illustrious gathering of the most distinguished mining men of the United States. In the presence of so many evidences of good will it is almost needless for me to extend to you formal greetings of

welcome. Half a million South Dakotans would greet you and welcome you and will follow your deliberations with great interest and enthusiasm. The problems which you will consider are problems of tremendous importance to this young state. While South Dakota is best known as one of the great agricultural states, our vast mineral resources challenge our most careful consideration. We have within our state not only the largest gold mine in the world, but what is believed to be the richest one hundred square miles upon the globe. Our mining experts will tell you we have mountains of precious metals; our regents of education will say to you we have the best School of Mines evolving the best methods for securing these metals; and I know we have men with the best mind and muscle to do the work. Since the 26th day of July 1874, when H. N. Rose washed the first gold from French Creek, about one hundred and twenty-five million dollars of gold have been taken from South Dakota mines. While we are contributing our full share towards the world's supply of the precious metals our immense mining enterprises are in their infancy, with hundreds of mines awaiting development.

The industry which you represent is most intimately connected with the business life of the country. The output of the mines supplies the vital spark—the energy of commerce. Close every mine and you would shake to its foundations every industry in the country.

We all rejoice over the prevailing universal prosperity. I am proud of the fact that I can welcome you to a people who are superlatively prosperous, contented and happy; where the spirit of success dominates the commercial and industrial atmosphere; where everybody has surrendered to the magnificent energy which is building a new and splendid empire. I welcome you to a people who for six years have produced more wealth per capita than any other state in the Union; to a state famous for the large number according to population, of newspapers, churches, colleges and school houses; to a state absolutely free from conflict between labor and capital; to a state settled largely by the children of the pioneers who were the empire builders of the Great West—children who from infancy were taught the lessons of vigorous manhood; a people who adopted as their state motto:

“Under God the People Rule,”

and who, as individuals and communities, with reverence for all law, human and divine, are living up to their high standards of right. I have no apologies to make for this young commonwealth. A few years ago, in the midst of universal distress, when financial ruin was prancing up and down Wall Street, when civilization seemed to have entered upon an epoch of unrest, our people were fearlessly facing serious problems and thinking and struggling—perhaps not always wisely but always with the conviction of honest men. Triumphant the people shook off the burden of despair. Ten years ago the real value of all property within the state was less than one hundred million dollars; today it is one thousand million! Today every South Dakotan is proud of his state and with joy and devotion ready to join the grand chorus of thanksgiving and praise:

“I love ev’ry inch of her prairie land,  
Every stone on her mountain side,  
I love every drop of her water clear  
That flows in her rivers wide.  
I love ev’ry tree, ev’ry blade of grass  
Within Columbia’s gates.  
The queen of the earth is the land of my birth,  
My own United States.”

Members of the American Mining Congress! I welcome you to a state that feels honored by your presence. I sincerely hope and believe that your deliberations will be profitable and pleasant and that when



you leave our state, it will be with the most pleasant recollections and delightful impression that South Dakota has not only the natural resources and the people but the foundations firmly established for honorable membership in the splendid galaxy of the great commonwealths of our country. (Applause.)

**PRESIDENT RICHARDS:** You will now listen to a selection of music by the band.

**PRESIDENT RICHARDS:** An address of welcome on behalf of the city of Deadwood by its mayor, Mr. E. McDonald. (Applause.)

**MAYOR M'DONALD:** It gives me great pleasure to welcome the American Mining Congress to Deadwood in the name of its citizens. It is the first time your association has turned its face in the direction of the richest one hundred miles square on earth and we feel confident that you will be given the heartiest welcomes and a grand acquisition to your membership.

I hope that your stay among us will be so pleasant that on your return to your homes you may at least be able to say that you have had a pleasant time, if not the pleasantest among your six annual meetings. Deadwood has invited you to this city and you have accepted the invitation in the same spirit in which it was offered and I do assure you of our pleasure in having you with us and again say that we shall feel amply rewarded if your visit will prove a profit and pleasure to you.

We regret exceedingly the absence of President Roosevelt, whom we had supposed would have been able to have accepted the very cordial invitation that was extended to him by the Black Hills Mining Men's Association. Still, we are gratified to be favored by the presence of such a distinguished representative in the person of Hon. Leslie M. Shaw. (Applause.)

You are here to exchange greetings and to renew your acquaintances one with the other, to have as much pleasure as you can and do what you can to bind the members of the American Mining Congress closer and closer in the bond of union which is growing stronger with each passing year. You can and are by these gatherings getting nearer and nearer together, thus enabling you to harmonize opinions and unite on general principles, although differing on details. It is impossible for us all to agree upon everything. We will have our differences and should have. If not, all advancement and progress would cease and the world would retrograde. We grow wiser and better by the exchange of opinions.

Twenty-five years ago no one would have supposed it would have been possible to bring so large a number of mining men together in one grand body like the American Mining Congress, hence we have reason to rejoice over what has been accomplished so far and have reason to believe that the future is bright with possibilities.

At the last meeting of the Mining Congress, Mayor Davey was desirous of turning over the keys of the city to your president, saying his inability to do so was caused by the neglect of Mayor McDonald to return them. (Laughter.) The insistence of Mr. Elliott of Montana that we refrain from transacting any business of any kind or character prevented my making any explanation at that time and I think it is due you to know why I failed to give the keys to the mayor for the benefit of the Congress. The night before our delegation was invited to dinner by Col. James Lynch (Cheers) and those of you who know him can form some idea of the time we were permitted to leave his hospitable home. It was late, yes, very late in the morning, and on nearing the Thornton we were accosted by a large body who inquired if we were the South Dakota delegation. Being informed that we were they asked if the mayor of Deadwood was with them. I replied that I was the mayor of Deadwood and was proud of it. They wanted the key to the hospital. At the mention of the word hospital we all became alarmed and we all volunteered our services,

saying that every man from Deadwood was a Good Samaritan. They said they were in quest of trained nurses, they wanted seclusion and rest; that although they had preceded us a week they found that the South Dakota delegation was in the forefront of popularity. What could a man do, representing the generous citizens of Deadwood, but to hand over the bunch of keys?

Now I am not going to give the keys of the city of Deadwood to President Richards; not because he is not a good man; his reputation has preceded him. He has paid us a number of visits during the past year to consult with his invaluable co-worker, Mr. Mahon. (Cheers.) We had an opportunity of learning something of Judge Richards, modest and unassuming way, and any organization should be proud to be the possessor of such an able and dignified president. (Cheers.) Now you will observe that I have no personal reasons—I love the judge; to know him is to love him; he is a man among men; a prince among gentlemen, but I cannot give him the keys to the city of Deadwood. I have conceived the idea that on this occasion an open door policy without the Russian bear in the doorway would be preferable to the American Mining Congress.

Our homes and hearts are open to you and if you should find anything under lock and key report it and I will ascertain the reason why. (Laughter.) Now, to the city of Deadwood, I join with our people in welcoming you and I trust that your visit will prove an era in the life of the American Mining Congress. (Applause.)

PRESIDENT RICHARDS: I take this occasion to call upon our secretary to read a letter recently received by your congressman, Hon. E. W. Martin, from the president of the United States.

SECRETARY MAHON: Mr. President, Ladies and Gentlemen:  
"White House,  
Washington.

Oyster Bay, N. Y., August 28, 1903.

My Dear Mr. Martin:

I am very sorry to find that it will be out of the question for me to attend the session of the American Mining Congress next month. I take a particular interest in this meeting, because many of your members I have myself the honor of personally knowing. I not only believe with all my heart in the work, but in the men who are doing it.

Please convey to the delegates assembled my hearty good wishes for the complete success of the meeting.

Sincerely yours,

THEODORE ROOSEVELT,

Hon. Eben W. Martin, M. C., Deadwood, S. D." (Great applause.)

PRESIDENT RICHARDS: Your committee on program has designated myself to respond on behalf of the American Mining Congress to the addresses of welcome that have been extended this congress.

I was notified by the mayor of Deadwood on yesterday that he would have the best of me today and I see that he has because he still holds the keys to this city. I thought when I heard the name McDonald, that he probably came from Bonnie Scotland, but upon hearing the smoothness of his tongue I think he has received the inspiration of the Blarney stone of Ireland. (Applause.)

It gives me especial pleasure to respond to these addresses of welcome on behalf of this Congress for many reasons, a few of which I will mention. When this Congress was in a state of possible disorganization the people of these Black Hills had an active part in reorganizing it. When it was in a state of poverty they gave it money. When it wanted a home they took it in, and today when it



stands forth here in this city filled with hope they rejoice with its prosperity, and whatever of good it may accomplish in the future the people of the Black Hills will have a large share in whatever that good may be. (Cheers.)

I know from experience that, although you may have here the richest one hundred square miles on earth in gold and material wealth—I say I know from experience that you have also a greater wealth than that in the sturdy manhood of the Black Hills. It is greater because it means more to this commonwealth than all the gold and silver hidden in these great mountains, because in the end it means higher citizenship and from the generosity, good will and strength of manhood that I have met here, you have a greater wealth in your manhood and womanhood than all the wealth of these hills otherwise. (Applause.)

This Congress and its officers have received an inspiration from the Black Hills Mining Men's Association—the model Mining Men's Association of the entire West—and that inspiration will go out through the influence of this congress into every mining camp in the country. They will pattern by your model and by your inspiration and so this work will go on.

So I say it gives me particular pleasure to respond to these addresses of welcome giving this Congress an opportunity to testify to the worth of the manhood of the Black Hills.

PRESIDENT RICHARDS: We will now listen to a further response from Mrs. Dignowity.

MRS. DIGNOWITY: Mr. President, Ladies and Gentlemen: This is rather a low grade proposition I have to offer this morning. We hope though, with proper treatment, to extract some little value from it. I have entitled this little doggerel which I have to offer, "America's Mining Man."

### AMERICA'S MINING MAN.

[By Ella Purkiss Dignowity]

To "The Congress of Mining Men" assembled here within these templed hills,

A message of welcome is given which should banish all your ills.

For thoughts are potent forces, that have ruled the world for aye,

And the best of them is offered to the Mining Man today.

Hearty cheer, good will, kind greetings gracious hosts extent to you.

Old bonds, new ties, and hopes awaking making life begin anew.

Here the Mining Man—God speed him—will be recognized this week,

As the King we all must bow to, and whose throne we proudly seek.

He has been our brave crusader searching for the hidden grail,

His dauntless courage and sturdy heart an invincible coat of mail.

Full of the vigor of manhood, keen-eyed and alert of brain,

Strong in hope that never deserts him and faith that leads on to the "vein."

Who dares to limit his power? For intellect reaches the gold,

The same spirit within that urges him on, filled these hills with treasures untold.

But the treasures are wondrously precious, and not to be lightly won,  
So our knights must struggle to conquer, and valiantly battle on.

Even though "faults" are encountered and "dead work" he cannot pass by,

His courage and grit light the tunnel ahead more than his candle on high.

For he knows that life's valued possessions are ever hard to win,

And the best, in both man and mountain, is jealously guarded within.

And only a brave, noble spirit is fitted to penetrate  
 The shrine of the Holy of Holies from whence glories radiate.  
 And who is more worthy to seek there and wear the metals won  
 Than the Pioneer of the Mining Camp, the man who followed the sun?

He knows hardships but never shirks them, he seeks what is hidden  
 from view,  
 For the soul is not found on the surface, nor the heart of anything  
 true.  
 But now he has caught the gleam and glitter of God's treasures hidden  
 so deep,  
 Which lay waiting like all of His blessings for Knowledge to rouse  
 them from sleep.

And lo! cometh forth priceless metals unloosed by the Master hand;  
 The Mind that created has power to give His secrets to all the land.  
 And who is more zealously seeking to solve problems earth holds today  
 Than the Mining Man working and delving through the darkness that  
 baffles his way?

So here's to the Mining Congress, Metallurgist, Investor, all hail!  
 The Miner, Promoter and Engineer, too, united they must be or fail.  
 And here's to our hosts, and their cities the keys to you have been  
 tendered.  
 But the world is yours, and its richest gifts when "credentials" are  
 properly rendered.

With intelligence, purpose, courage and strength, willing hands and  
 stout heart brave and true,  
 Your minds and bodies ever alert, no limit encompasses you.  
 For deep in these mountains and here in your breasts dwells He who  
 conceived the whole plan.  
 Prove your metal and find after all the tests, the best values God  
 put in man.

(Applause.)

PRESIDENT RICHARDS: The Congress will now take pleasure  
 in listening to responses from members and delegates.

PRESIDENT RICHARDS: Hon. John L. Webster, of Omaha, will  
 address you for a few moments.

MR. WEBSTER: Mr. President, Ladies and Gentlemen: Rather  
 unexpectedly some of my friends upon the platform have thought  
 that I ought to say a word as a member of this Congress in response  
 to the welcome which the governor of this state and the mayor of this  
 city have so well tendered you.

I come here with a high appreciation of the wealth that is stored  
 in these mountains and of the generosity and nobleness of the citi-  
 zens, not only of Deadwood, but of the entire state of South Dakota.  
 We have all heard of the wealth that lies buried in the Black Hills;  
 this range of mountains underneath which God seems to have stored  
 billions upon millions of wealth and then have raised them up above  
 the vast plains so that man could not miss them and, in his search  
 for wealth, should take from them the gold that is to enrich the world.

But there is more in South Dakota, I should undertake to say,  
 than simply the gold that comes from under these mountains. Your  
 president has spoken of the noble manhood of her citizenship but  
 if we speak of her wealth no one has stopped to count the wealth  
 that comes from her harvest fields that are grown from her soil and  
 that which, when added to the wealth that comes from her moun-  
 tains, bespeaks for the state of South Dakota a very bright future.  
 If you ever look over its area of territory, its opportunities and its  
 possibilities and measure it by like extent of territory in any state,

there is here an opportunity of boundless wealth and prosperity. Some of our oldest states we can count wealthy simply because they have been in existence and members of the great Union for perhaps near a century, but when this state shall have become peopled as they are, when wealth shall have come here in all its villages, towns and cities as it is in such older states, the state of South Dakota, by proper development, may come to rank in wealth and population as one of the older states and I doubt not in the great future it may rival the rich old state of Pennsylvania. Mark you, ladies and gentlemen, the tide of civilization seems driven westward and with the tide goes emigration and with it goes wealth and industry and when all these are combined with noble manhood the possibilities of the state of South Dakota to take great and high rank among the states of the American Union is one of the things not only hoped for but within the range of possibilities and I sincerely believe it. (Applause.)

PRESIDENT RICHARDS: There being no further responses I will call upon the chairman of the program committee to make any announcement that he may have to make at this time for this afternoon.

Mr. Elder, chairman of the program committee announced at this time the program for the afternoon.

(Calls for Martin, of South Dakota.)

PRESIDENT RICHARDS: Mr. Martin needs no introduction. Everyone knows him. (Applause.)

MR. MARTIN: Mr. President, it is not announced in what capacity I am expected to speak a few minutes before you break away for dinner, but surely I cannot speak in the capacity of a guest and cannot make a response. I am, therefore, limited to speak in the capacity of host. You have been most eloquently and cordially welcomed on behalf of the state by our esteemed governor and on behalf of the city of Deadwood by the gentleman from Cork, our honored mayor. (Cheers.) Nothing is left to me but the broad nation as a whole, which welcomes you, and this unique little section of the Black Hills by itself, which welcomes you also.

The American Mining Congress, of course, represents the mining industry in all of its broad relations and the mining industry including, as it does, coal, iron, copper—indeed, all of the metals, base and precious, stands in point of importance among the great industries of this country only second to the primary industry of agriculture. Agriculture, of course, is absolutely essential to the feeding of our population, to the sustaining of life; but at the basis of all our industries beyond that comes this industry of mining. Coal must be had to furnish fuel to warm the human family, then metals must be had—the basis from which all the industries must be carved, whether they pertain to the broader utilitarian industries or to the fine arts, and so the nation realizes that in this association it is indeed interested and it welcomes this meeting and welcomes it at this place at this time and takes great interest in its deliberations.

But on behalf of this little section of the Black Hills, which has been my home for nearly a quarter of a century, I desire to offer a few words of additional welcome to the welcome of the city of Deadwood and of the state of South Dakota and it extends to you a generous and cordial greeting. It is indeed the real thing in hospitality, as you will discover before you finish your deliberations and your social amenities of the week. The Black Hills people say to you: "If you see anything you want take it. If you want anything you don't see simply ask for it, and if you should chance to see anything you don't want don't mention it." (Cheers.)

Nature seems in these Black Hills to have reached her superlative act in creation. Some one at some time has said that the Black Hills was made by Nature throwing in here all of the leavings



after all the rest of the world had been made. Now that suggestion was made, of course, because of the wonderful variety of our resources here. There is practically nothing in mineralogy that cannot be found in the Black Hills, not only precious metals, gold and silver, but here we have copper, we have iron, we have asbestos, indeed at the close of this meeting or at some time call upon Col. George and he will furnish you a list of Black Hills metals which I know he had printed some years ago, which is entirely too long to be mentioned here. I think because of the multiplicity of our resources that remark was made of us but the facts are reversed. Nature first selected the choicest of everything she possessed and placed it here and what she had left she passed around to Nebraska, Pennsylvania and Idaho, and the other proud states of this nation. (Laughter.) And so here, whether you come from the standpoint of the mineralogist seeking to study the metals of the earth or whether you come as a geologist to see the marvelous illustrations of geology, you will find here we have much to invite your attention to. I do not know whether it can be said of any other section or not—I do not know of any other—but it can be said of the Black Hills that in many places the geologist can start from the surrounding foothills and by traveling three miles into the interior of the mountains he can find uplifted and exposed for his investigation that represents one mile in actual depth of the earth's crust. It is the geologist's paradise. If you are a geologist we welcome you to all of this and above all we welcome you to the hospitality of our homes in these twin cities, Lead and Deadwood.

You will have an opportunity upon Thursday of seeing what has not been given to the public generally and indeed to a very few to see in the period of twenty years. You are permitted to visit the lower levels of the Homestake mine, which has been probably told you to be the greatest gold mine in the world, and I understand that Mr. Grier does not pretend to be at all particular or exclusive as to who may visit that mine upon this occasion. If I am correctly informed not alone these delegates but all visitors generally who are attracted here will have an opportunity to visit the mine. You will there see what is typical of Black Hills gold mining. Gold mining in the Black Hills is not a speculation; it is a manufacturing industry, and I undertake to say there is no industry as stable or certain in manufacturing as making gold in the Black Hills. Our ore bodies, while comparatively low grade, are of vast extent and as a rule their richness is comparatively uniform so that it may be told from day to day with almost absolute certainty how much four thousand tons of ore, for instance at the Homestake mine, produces in precious metals and the production is practically the same every twenty-four hours. The product when made the yellow product of gold, is the most stable and fluctuates less in value than any other, and so you could not cite an industry of manufacture anywhere that is so stable or so certain as gold mining in the Black Hills when it is followed with intelligence, with capital and with courage. I was not called out here, I apprehend, to pose as a promoter for the great mines of this country, but I have such great confidence in it that I would not have announced these important facts to you at the beginning of this Congress, knowing you have an opportunity to corroborate them, did I not know them to be true.

So we say again you are welcome to the Black Hills and may this indeed be a red letter meeting in the history of the meetings of the American Mining Congress. (Applause.)

**PRESIDENT RICHARDS:** I desire to call the attention of the delegates to the advisability of leaving your credentials with the secretary at the Franklin hotel. A committee on credentials will be appointed at the noon hour to pass on credentials. Please leave them with the secretary so that they may be properly accredited this afternoon.



MR. RUSSELL, OF SOUTH DAKOTA: I have a motion to make, but before doing so I desire to state to the delegates and the visiting members here that the Deadwood Business Club extends all courtesy to you; that you need not wait an invitation, that you need not wait for a card, but you will make use of the rooms of the Deadwood Business Club as though they were your own. (Cheers.)

I also desire to call you attention to the fact that the city of Deadwood, through its committee, has gathered a collection representing the mineral wealth of the Black Hills, and which is displayed on the ground floor of the Bullock hotel. We trust that you will all visit it and study it carefully. There will be a committee in attendance at all times to give you such information as you may desire.

RUSSELL OF SOUTH DAKOTA: Mr. President, I desire to move you that a committee on credentials of three be appointed by the chair to act on the credentials presented to the secretary.

The motion was stated by the president, duly seconded and carried.

RUSSELL, OF SOUTH DAKOTA: Mr. President, I would move you sir that a committee on resolutions of twenty be appointed, to which committee all resolutions shall be first referred before reporting to the convention, and I would also add to that motion that the chairman of the committee be the Hon. E. W. Martin.

The motion was stated by the president, duly seconded and carried.

MR. DAVIS, OF MICHIGAN: I move we adjourn until two o'clock this afternoon.

The motion was stated by the president, duly seconded and carried.

The American Mining Congress adjourned to September 8, 1903, 2 P. M.

September 8, 1903, 2 o'clock P. M.

PRESIDENT RICHARDS: Congress will be in order.

PRESIDENT RICHARDS: Owing to the fact that Mr. Darton has been unexpectedly called away the program committee has found it necessary to make a slight modification of the program for this afternoon. Therefore at this time you will have the pleasure of listening to Mr. Nelson H. Darton, superintendent in the work of the United States Geological survey in the Black Hills.

NELSON H. DARTON: Mr. President, Ladies and Gentlemen: One of the principal features of the work of the United States Geological Survey is the study of the mineral resources of the country. Many of its most detailed surveys are directed to the important mineral districts. Accordingly the Black Hills have received much consideration.

For several years surveys have been in progress and they are now being continued from time to time with a view of obtaining all available data regarding the mineral resources of the Black Hills and the light which they throw on the philosophy of mineral bearing formations and on the occurrence of ores and their extensions to any other portions of the Black Hills district than those which are now known to contain ores. The purpose of the survey is to make a complete investigation of Black Hills mineral resources. Various men are employed in the work and have been from time to time. Some study the stratified rocks, the sandstones, shales and other formations surrounding the Hills; others study the crystalline rocks in the central nucleus area of the Hills, so the work is in the hands of specialists, men who have made a particular study of the different branches of geology. The science is so highly specialized that almost any section requires the attention of a number of special students and the Geological Survey has provided that sort of service in the study of the geology of the Black Hills.

The first work that was done was the preparation of the topographical maps. It is altogether important in working out geological relations and understanding the distribution of formations and their significance to have an accurate map and one of the principal functions of the Geological Survey is to prepare very accurate maps. They are surveyed by civil engineers and on a suitable scale for the representation of the topographical features. The ups and downs of the land are shown very accurately by contour lines and the water courses and the lines along which drainage would thus flow in time of rain are all shown very accurately, so that the map forms means of locating all geological data. Besides, they are of great service to persons who reside in the region and who travel through it. Accordingly, the Survey has projected a very accurate system of maps for the Black Hills and they are nearly completed. Men are now in the field extending the work and finishing some of the portions of the outlying area, but the greater part of the Black Hills region has been accurately mapped. This has required a great deal of time but the result is one that I know will be a source of great satisfaction to those who live in the Hills and interested in its mineral resources and geology.

The study of the mineral resources has not been completed by any means. Several of our geologists have been in the Northern Hills in seasons past studying the wonderful resources of mineral deposits here, deposits that are very diverse and present many unique and unusual features. Their study is certain to throw a great deal of light on the philosophy of mineral vein formation. We learn that the Black Hills show many obscure conditions under which ore occurs and which are most interesting, and if studied intelligently will explain the existence and extension of similar ore in other places.

Then the formation that will be put on record is very extensive. We have now in preparation a standard publication of the survey, a folio as it is called, that covers the entire region about Lead and Deadwood showing the different geological formations, and has the different contacts and different rocks precisely located. These maps are made, as I spoke of before, showing all the topographical features and a person who can locate himself on a map of that sort can follow the different geographical features and know just what they signify. This folio is now being prepared for engraving and in the course of a few months will be published and will be published in the usual method of survey publications for distribution at the cost of printing and engraving, twenty-five or fifty cents apiece, which is, of course, a very cheap thing and puts it within the reach of anyone.

Then there will be published a special report besides that on the mineral region of the northern half of the Black Hills. We have already published a report on the geology of the southern half of the Black Hills, especially the sedimentary formations and all information available that throws light on the prospects for obtaining underground waters on the flanking of the Hills and regions to the east and south. One special branch of our Survey is investigating the prospects for obtaining underground waters. Artesian wells will probably be a success in a wide area east of the Black Hills. The district now is very sparsely settled and there is much difficulty in obtaining water for domestic use, irrigation or other purposes. We are obtaining evidence from the study of the geological structure that shows that such waters are available for wells of reasonable depth. Also, under the Reclamation Act we will be able to sink wells to determine whether those waters are really there and as to how high the water will rise, so that they can be fully determined and some definite encouragement for sinking wells be held out. That work is also being extended into the northern Black Hills. Mr. O'Hara, and some others, are studying the geological structure very carefully so that we may ascertain how far the Belle Fourche artesian basis extends. There is really more need for water in some of the country immediately adjoining the Black Hills than for information



regarding the mineral resources because it affects the interests of a large number of people, so that the Survey is devoting a great deal of attention to this question of underground waterflow. These Hills are due to the upheaval as Professors O'Hara and Todd will tell you, of the earth's crust, that brings to view a great many of the rocks that underlie the plains to the east and north. We can study the upturned edges of these rocks about the Black Hills in a very definite way indeed and learn what the conditions are likely to be in the adjoining plains under which the rock are known to dip.

Another feature of our geological studies of the Black Hills will be a model that is to be prepared, or is now being prepared, for the St. Louis Exposition. It is provided for by funds appropriated by the state, and, as I understand it, the Black Hills people in part, and is to represent the relief of the entire Black Hills district, to show in a model about 8 feet long the shape of the country, the topographical features of the country with the ups and downs in miniature and on that will be represented the geology of the entire district. Also in another model of a portion of the region on somewhat larger scale, the principal features relating to the mineral resources of the northern hills will be represented. That will be ready in the course of a month or two and will be exhibited at the Exposition as I said before. The survey will publish from time to time folios covering portions of the Black Hills to the south and east. One soon to come out will relate to the Newcastle and Cambria coal fields and discuss the relations of oil in the region about Newcastle. This has excited a good deal of attention and the country has been exploited for oil to a considerable extent. There will be folios describing the geology, mineral resources, various mines, prospects for underground water and setting forth all information available on those subjects on a large scale, so that we have in all half a dozen or more productions to prepare in the course of the next two or three years that will throw light on the geology and mineral resources of the Black Hills. (Applause.)

PRESIDENT RICHARDS: I have appointed the committee on Credentials and Resolutions and I will now ask the Secretary to read the appointments.

Secretary Mahon read the names of the Committees as follows:

#### COMMITTEE ON RESOLUTIONS.

1. E. W. Martin, chairman .....South Dakota
2. J. H. Lynch..... Montana
3. George W. Dorsey.....Nebraska
4. Ed. F. Brown.....Colorado
5. L. M. Davis.....Michigan
6. W. S. Mears.....Missouri
7. O. E. Jackson.....Idaho
8. Lyman A. Sisley.....Illinois
9. E. B. Spaulding.....Connecticut
10. E. V. Drake.....Oregon
11. Ivan E. Goodner.....Wisconsin
12. George M. Bennett.....Minnesota
13. Asa L. Ricker.....Maine
14. Henry Earle.....New York
15. Col. Thos. Ewing.....California
16. Lewis G. Wright.....Ohio
17. C. F. Heckler.....Pennsylvania
18. T. A. Harding.....Iowa
19. C. B. Simmons.....Indiana
20. L. Bradford Prince.....Mexico

#### COMMITTEE ON CREDENTIALS.

- Richard C. Patterson, Chairman.....Nebraska  
 W. S. Tarbell.....Colorado  
 C. A. Hutchinson.....Illinois

SECRETARY MAHON: I will state for the benefit of the chairman of the Committee on Credentials that I have the papers here ready to turn over to him whenever he desires.

PRESIDENT RICHARDS: The Program Committee has set aside this time for what they term the "President's Annual Address". It was thought best by the Executive Committee that as the American Mining Congress is now in process of permanent organization that it would be best for the president to present to you some of the reasons why or claim that it has to a right to exist, and as that must become official, it would be better to prepare it in the form of a paper that it might be more accurately stated than it could be done by an off hand statement. Therefore, with your permission, I will present to you these thoughts for your consideration.

#### PRESIDENT'S ANNUAL ADDRESS.

It seems to me a cause for special congratulation that The American Mining Congress should be privileged to hold its first annual session at this place, amid surroundings for which nature has done so much, in a locality so justly famous as a center of mining industry, in a region so distinguished as the Black Hills for the strength of character and progressive spirit of its mining men. For many of you this is perhaps a first visit, and judging from my own experience, I am able to assure you that you cannot sojourn here for any length of time, without feeling the inspiration of good fellowship, without being conscious of the intellectual stimulus which always comes to men from associating with those in the front rank of their business or profession. You cannot be men of observation and fail to recognize the wonderful advantages with which this mining district has been endowed, the sagacity and foresight with which those advantages have been utilized. And from a social point of view, I am sure that no one could come within range of the generous welcome which has been accorded us in Deadwood and Lead, without being reminded anew of the sturdy individuality and simple courage of mining men as a class, not easily spoiled by success, or daunted by apparent failure.

At our last session you were constantly confronted with the contingency that this Congress was destined to be a failure, and that, at the best, its continued life and usefulness hung in the balance. But at this hour you are buoyed up with the conviction that The American Mining Congress is and must be a success. The former apprehension was depressing, the latter conviction is inspiring. The anticipation of failure paralyzes action; the realization of success nourishes hope, inspires endeavor, achieves what it wills to achieve. Therefore, I particularly congratulate you that this session is to be held amid influences so in harmony with the hopes of your organization.

The American Mining Congress stands before the world today as a legal entity. Its aims and purposes are briefly set forth in its Articles of Incorporation, now on file in the office of the Secretary of Colorado, the state of its nativity. In compliance with instructions received at your last session, our Executive Committee has incorporated this body under the name of "The American Mining Congress". Colorado and Denver were selected as the home of this Congress, first, because the laws of that state permit of the elasticity necessary for an organization of this character; second, because Colorado is a great mining state in almost all departments of mining industry, and can give valuable support locally to such an organization; third, because Denver is the largest city in the intermountain region, most centrally located with reference to the great bulk of our mineral production, and accessible from all directions.

In this connection I may also say that a body of by-laws, designed to regulate and foster the development of the Congress, will be presented for your consideration.

One other quite important matter has to some extent demanded the attention of your executive officers since you last met. At Washington last winter, when the bill for the organization of the Depart-



ment of Commerce and Labor had been introduced and was under consideration, representatives of our body made strenuous efforts to have that bill modified so as to provide for a separate Department of Mines and Mining. We would have preferred to have this agitation postponed, until we were in a stronger position to assert our claims for recognition, but the issue was precipitated by the determination of the advocates of the Commerce and Labor bill to carry that measure through. During the pendency of that bill a circular was issued by your Executive Committee, embodying in concise form the arguments in favor of the immediate creation of a Department of Mines and Mining. This circular was sent to the members of the House and Senate, and to the President. Although a number of our congressional representatives from western states stood manfully by us in our fight to secure this recognition, I am free to admit that there was no widespread popular sentiment in evidence at that time, such as would have justified Congress in granting the mining industry recognition of this character. So far as direct results were concerned, our endeavors in this direction were no doubt doomed to failure on that occasion, but we felt called upon to do something under the circumstances, the agitation was forced upon us, and we did what we could. The experience, however, has not been without its value. It shows that official recognition of the mining industry, on the lines that agriculture has been recognized, is a question of time and education—education not only of the politicians, but of the people; for the politicians will quickly enough respond to the popular demand when it comes. In the second place, this experience proves that the results desired in this direction can only be achieved by a powerful central organization, backed by numerous affiliated local organizations, having its ramifications in every mining camp, presided over by men of prominence, ability and known interest.

I therefore particularly wish to impress upon all my fellow delegates here, the importance of doing everything in our power between this and the next session of our Congress, to build up and develop local mining associations in our respective localities. And when these organizations have been formed, keep them alive—don't let interest flag. Base the membership in each instance upon your practical mining men; and if any one who wishes to aid in the establishment of such an organization, desires information as to the ways and means of organizing, the results to be aimed at, the best method to make such an organization a permanent success and a benefit to all concerned, I cannot do better than direct such inquiries to that splendid working model, the Black Hills Mining Men's Association, which we find in such active and beneficent operation here. (Applause.)

So much for the record of the past year. Now in regard to the present and in regard to the future, it is most natural to ask, and every thoughtful delegate will be apt to formulate the inquiry, in his own mind at least; What is the aim of this Congress, and what good is there to be derived from it? What are we here for? Is it to have a good time merely, to meet friends and acquaintances in the same line of business, to form pleasant or profitable business or social relations, to sell mining properties and float stock? I presume that any of these subjects may properly be incidental to our presence here, but still it seems to me that if The American Mining Congress is to attain the highest measure of success and permanence as an institution, there are greater things than these in store for it. The exchange of views upon current subjects, and the acquisition of information, is certainly an important part of our business here; but the ultimate aim of our organization must be to place the mining industry as a whole upon a plane commensurate with its importance. The affairs of the Congress must be conducted in a business manner, and on a business basis, such as will commend it to the best business thought of the day. Our annual sessions must be of a character that will attract the best talent, whether it be in mining pure and simple, or in the great business enterprises connected with and springing from mining, or in the

scientific and technical departments of mining. I think we are making progress in this respect, and there is of course always room for improvement. In short, this Congress must arouse so much interest throughout the whole country, must be the means of giving the public so much valuable information about mining, that the people will at last realize the importance and dignity of everything connected with the proper development and utilization of this great source of raw material; it must be the means of finally opening the eyes of our law-makers to the necessity of a Department of Mines and Mining, according in rank with the Department of Agriculture and the recently created Department of Commerce and Labor. (Applause.)

Now we have no quarrel with the Department of Agriculture or the Department of Commerce and Labor. The establishment of these departments and their extremely useful activities, illustrate and emphasize what was said by your Executive Committee in its memorial to Congress last winter, with reference to the importance of purely industrial departments in modern administration, and perhaps I cannot do better in this connection than to quote a few paragraphs from that memorial:

"The hour has arrived in the destiny of nations when the ability to produce abundance of raw material is of more importance than the ability to place armies in the field, when national power and influence is extended, not so much by means of guns and ships, as by being prepared to sell most cheaply.

"The warfare of the future is to be an industrial warfare. The rivalry of the future between nations will be less a rivalry of brute force, but more a contest to produce at the lowest cost.

"In the past governments have collected and spent taxes for military armaments. In the future, if they are to survive in the race for supremacy, they must spend the money of the people in equipping the people to fight their industrial battles.

"This is the secret of a growing tendency among civilized nations. the institution of industrial departments of administration, which in practical influence and importance are co-ordinate with their political departments.

"It was upon this theory that fourteen years ago, Congress passed a law creating the Department of Agriculture, in order to give governmental direction and supervision to one of the great primary sources of raw material.

"It is upon the same theory of rapidly increasing importance of the purely industrial functions of modern government, that we now ask for the enactment of a law creating a Department of Mines and Mining, the other great source of raw material for our manufactures and of profit for our lines of transportation."

As I say, we have no quarrel with the Department of Commerce and Labor. I am sure that mining men everywhere will gladly co-operate with the officials of this department in any line of action that promises better things for the mining industry, whether it be in the direction of proper governmental regulation and inspection, scientific research by government experts, or the gathering of more accurate and detailed information in regard to the mining of ores and production of metals by government statisticians. This new Department was bound to come, and we hail its coming as a healthy manifestation of the tendency referred to, because to that extent it strengthens a weak point in our system of administrative government.

But we still say, nevertheless, that Mines and Mining should have had precedence; that the raw materials which are the first condition and indispensable prerequisite of all manufacture, all commerce, all prosperity and all civilization, ought by right to have prior consideration at the hands of our law-givers in the establishment of these industrial departments. The proper beginning was made with the Department of Agriculture, and, logically, the next to follow would have been a Department of Mines and Mining, the other great leading source of raw material. These industrial departments of administra-



tion should begin where production begins. Raw material, in its primitive form, is the working capital with which the God of Nature has endowed the human race, and, according to the dictates of natural justice, the fish in the sea, the timber in the forest, the iron ore under the surface and the fertile soil above it, constitute a natural bounty, in which each of the children of men has an indefeasible inheritance. On abstract grounds possibly there is even more justification for governmental supervision and protection of mining than there is for governmental supervision and protection of agriculture, because those disposed to greed and armed with power can monopolize the production of coal or copper, but they cannot monopolize the production of corn. Again, there is only a fixed and limited quantity of the ore in existence from which the useful metals are produced. Scientists already look forward to the time when the veins of coal will be exhausted, but the earth still contains and constantly renews the fertility required for countless future harvests of wheat.

I make these remarks in no querulous spirit, for our time will come, and we can afford to wait. The logic of events, the irresistible force of a controlling tendency in human progress, must ultimately compel the proper recognition of the mining industry at the hands of this government, as one of the necessities of governmental organization. The leading European nations already have their departments of Mines and Mining, by which their governments are placed in close touch with this great and important source of production, and thereby enabled to intelligently carry out plans for its development and protection. Now the industrial rivalry between Europe and the United States is becoming so keen that it partakes of the nature of an armed strife, in which every nerve is strained, every expedient resorted to, and in which, on their side, governmental power and influence is openly enlisted. We have not gone so far as Europe in the direction of governmental aid to industry, partly because the mechanical genius of our workmen and the executive ability of our captains of industry, coupled with our vast stores of cheap raw material, have thus far made our economic preeminence comparatively easy of maintenance. But let us not make the mistake of over confidence. Foreign capitalists are already imitating American methods, and they have the advantage of much cheaper labor. The centralized governments of Europe are marvels of bureaucratic organization, and when they definitely turn this organization from the field of military rivalry to the field of industrial rivalry, the results will be startling. They have already entered upon that path, and they consider it as much the business of government to give the producer, in every field, an advantage over his foreign rival, as they do to keep a fortress equipped for defense or a regiment ready to march. It is these powerful and efficient governmental organizations, whose energies are being already directed into industrial channels, that the United States must cope with in its future striving for the world's trade, so that it must become more and more the business of this government, to equip its people to fight their industrial battles.

One of the things that makes America distinctly American, is the individuality of the citizens, and hence it is that we instinctively seek individual opportunity and national growth on a basis consistent with the highest individual development. This principle has always been a watchword of the great republic. But now thoughtful men are coming to see that the principle must have a new application in order to maintain its old efficiency. We say now, as we always have said; give the individual a chance, give him industrial freedom and opportunity. But formerly in this country, the opportunity came from the vast tracts of fertile land to be had for the taking in the virgin forests, the undispoiled fisheries, the placer gold on the surface of the ground. These industrial opportunities for the individual, are in a great measure passing away; some of them have already disappeared forever. On the other hand, the industrial competition of Europe is constantly growing keener. How then shall the state of industrial free-

dom, the good chance in life for the common, ordinary man, which has been such a source of inspiration to our progress in the past, be insured and perpetuated for the future? Again, I say, there is only one answer to this question; our government must help its people fight their industrial battles.

This is a government of the people, by the people, and for the people, and I firmly believe the time is coming, when that sentiment will be true industrially just as much as it is true politically. The proper application of this principle to our industrial interests will mean something entirely different from the bureaucratic surveillance if I may use the term, which the paternal governments of Europe exercise in the industrial field; for there government is looked upon as something separated from the governed and above them, while here it is but the expression of their sovereign will.

Now it is common knowledge what the Department of Agriculture has done for the farmer, how it has broadened his markets by the systematic work of its agents in foreign countries, how it has diffused and popularized much needed information concerning crops, soils, and tillage, how effectively it has assisted the cultivator in fighting the pests that destroy his crops. It has invested agriculture with a new dignity and helped to make it a scientific occupation. We say that the mining prospector has just as good a right to scientific information from the government concerning mineral formations, the character of various ores and their proper treatment, for he too is a producer of the raw material that is a condition of all resultant production, and this cooperation on the part of the government may give him just the industrial chance that he needs. (Applause.) The farmer can get a bulletin from the agricultural department that will tell him how to supply lacking ingredients in his soil, and we assert that the average working miner, the man who is trying to make the most of his industrial chances, the intelligent producer and good citizen that we all know has an equally just claim to a bulletin from a Department of Mines and Mining supplying him with the technical information in his industrial field that may be vital to his success. (Applause.)

Through the agricultural department the government makes elaborate experiments in the cultivation of tea, in order, if possible, to open up a new possibility for American agriculture. It ransacks the globe to find a remedy for the San Jose scale in fruit trees, so as to insure the orchardist against the risk of diminished profits. Now, bearing in mind this principle, the development of our supplies of raw material as a public use, we affirm that it is just as much a public service to prosecute the exhaustive geological researches in each mining district which will make the work of the prospector and practical miner easier, more certain, and therefore more remunerative. (Applause.) No doubt if a private individual had discovered a remedy for the San Jose scale, his first step would have been to take out a patent, if possible, so as to be enabled to levy tribute for years to come upon all who desired to use it. But the government experts are authorized to devote the time and money necessary for this investigation, the remedy is found, and it is free to all. No one thinks of questioning this exercise of governmental power; no one doubts its beneficence.

Moreover, Congress has recently enacted very important legislation looking to the reclamation of our arid lands through governmental cooperation. This means a great deal to us in the far West, and some of our eastern friends were at first very much opposed to it, but it is now generally admitted to be a proper subject of governmental concern, since it is for the best interest of the whole nation that these immense tracts of desert but fertile land should be reclaimed and inhabited.

Now turn again to the mining industry. It is stated upon scientific authority, that even with all the improved processes lately invented and successfully applied, not more than one-fourth of the known valuable gold-bearing material in this country can as yet be



utilized. Many extensive mining districts are still undeveloped, because the ore is too low grade or too refractory to be worked with profit. These problems will, of course, be solved, the necessary processes and treatment will be discovered, and in all probability this will be done by scientific experts in the employ of private capitalists, who will thereby be enabled to tax such mining districts almost at will for years to come. I do not decry the enterprise of private capital; it is worthy of its reward, but I simply ask; why should not these researches and investigations in the field of mining, as well as in agriculture and horticulture, be prosecuted at the public expense, by the people and for the people, and the results achieved be made free to the people forever? (Applause.) Therefore, once more, I repeat; the people must be educated up to a better understanding of the importance of properly developing all our raw material as a public use, and the profound effect which such a policy may have on the commercial and political fortunes of the nation. It is and will be one of the most important functions of The American Mining Congress to take the lead in this campaign of education.

Our government owes it to the people whom it serves, to be in such close touch with industrial conditions, through its industrial departments, that it may be thoroughly informed as to those conditions, that its political policies, based on this information, may be both stable and farsighted, that its laws affecting commerce and industry may constitute one harmonious whole, and that no industry may be built up by governmental favoritism at the expense of another equally entitled to consideration.

We want to see the same farsightedness in the political world, based on a profound knowledge of economic conditions, as has been exhibited by Mr. James J. Hill in the industrial world, in anticipating the rise of a new commercial empire in our Northwest, in foreseeing and providing for that colossal trade with the Orient through our Pacific ports, which is ours almost for the taking. When that is achieved, we can well afford to practice a diplomacy, based, as Secretary Hay says; "On the Golden Rule," and we will be so big that we won't much need rapid firing guns or armored cruisers.

There is another idea which it seems to me would be a worthy object of the efforts of this Congress, and which I trust you will not regard as wholly impracticable. Our Congress should have a permanent home, just as it already has a permanent organization. It should have a permanent working staff of men of ability, who are paid to carry on its work between sessions, and whose business it is never to allow that work to flag. Its field of labor is becoming too immense to be covered by the labors of any one man, even a man of such herculean capacity as our honored secretary. (Applause.) At this home it should, and easily could, through the cooperation of all interested, gradually build up the first collection of ores and minerals in the world. In connection with this permanent home, and under the auspices of The American Mining Congress, a great mining university should be established, endowed with millions, which should be par-excellence the mining school of this country. (Applause.) We have many universities and many technical schools which give valuable instruction in mining and metallurgy, but none that satisfactorily covers this vast field from a national point of view. I confidently commend this idea to those of our mining capitalists who have amassed gigantic fortunes, the joint product of their good fortune and their good judgment. In no other way can they acquire a wider and more deserving fame; in no other way can they confer upon the mining fraternity, with which they have been so closely identified, a greater measure of benefit. Surely we do not lack mining Carnegies and Vanderbilts, nor have our wealthy mining men ever been called deficient in public spirit. Here is a use worthy of their millions, a project which would be an enduring testimonial to their sagacity and gener-

osity, an institution which would be a perpetual reminder to the people of the United States of the importance of rightly developing and conserving this mighty source of national prosperity.

Of course I merely suggest these things at this time. It is not to be expected that they can be accomplished all together or all at once. But a beginning can be made, we can work to the ideal in our thought, and we can approximate nearer and nearer to that ideal as the years pass by.

In closing this address, I have only to say, that I hope and believe the results of this session will be worthy of the representation of the mining interests of the country which I see here today. I hope and believe that in all our deliberations, and in any action which we may take, the standard of our talking and the standard of our doing, will be that which is designed to advance the interests of our organization as a whole, of our field of industry as a whole, of our country as a whole, putting out of sight for the moment, as far as we consistently can, the benefits to be deriyed by our own little section, or our own city, or our own special branch of work, by merely selfish striving along narrow local lines.

Your committees have prepared an intellectual feast for you, and I think that on their menu each one here will find courses which will specially appeal to him individually. We want you all to have a thoroughly good time, to feel that you are paid for coming, and then to go back home and work for this Congress till the next session comes around. If we all take off our coats, working steadily, disinterestedly and on broad lines, the success of The American Mining Congress is assured, and the benefit to the mining industry from our leaders will be incalculable.

I thank you, gentlemen, for your attention. (Applause.)

MR. RICHARDS: We are most fortunate today in having with us a member of the President's Cabinet. He needs no other introduction to you than to say that you will now listen to an address from Honorable Leslie M. Shaw, Secretary of the Treasury of the United States. (Applause.)

HON. LESLIE M. SHAW: Mr. President, Members of the National Mining Congress, Ladies and Gentlemen:

Some years ago I read a poem which, with slight paraphrasing, will express the situation of the hour:

"As landsmen sitting in luxurious ease,  
Talk of the dangers of the stormy seas;  
As fireside travellers with portentous mien,  
Tell tales of countries they have never seen;  
As parlor soldiers graced with fancied scars,  
Rehearse their bravery in imagined wars;  
Arrant dunces have been known to sit,  
In grave discourse of wisdom and of wit;  
As paupers gathered in congenial flocks,  
Babble of banks, insurance and stocks;  
As each is oftenest eloquent o'er what  
He hatches or covets, but possesses not;  
As cowards talk of pluck, misers of waste,  
Scoundrels of honor, country clowns of taste,"

I talk of mining.

The only study I ever gave the subject was to commit Eli Perkin's definition of a mining claim: "A mining claim, my son, is a hole in the ground, the owner of which is a liar." (Cheers.) I can readily distinguish by the applause those who have no mining stock for sale. For what purpose I am here I do not know. Your chairman has stated that I am to deliver an address, but that is a mistake. The newspaper boys, before I left Washington, learned that I was coming



here, and they wanted to know the occasion. I said to them: "A Mining Congress." They wanted to know what I was going to talk about. I said: "The Ravages of the Boll Weevil."

I have been greatly interested in the chairman's address. It is quite probable that the people generally do not fully understand the measure and full importance of the mining industry of the United States. I think most of us are apt to overestimate the relative importance of the business in which we are personally engaged, and to underestimate the importance of every other business and calling. I remember when a boy on the farm we used to consider farming about the only respectable calling in which a man could engage. We thought it bad citizenship for man to embark in any other enterprise. That was a mistake. If we learn nothing else today than that the diversity of American interests is the real occasion of this country's wealth, this gathering will not have been in vain. Do not misunderstand me. I would not for the world detract from or minimize the importance of the mining industry. Let us therefore illustrate. I was talking with Phil Armour one day, and he said: "I got rich when a young man by watching the coal and iron miners. When they were employed I packed every ham I could get my hands on. My partner, Mr. Plankington, would say: 'Phil, you will break us up.' I would answer: 'No, they are working.' When they quit working I sold everything I could dispose of." In other words, the success of the mining industry made Phil Armour wealthy. The success of the farmer makes the manufacturer wealthy.

I think we make a mistake in estimating the importance of our several industries by their apparent productiveness. From crude iron ore a manufacturer produces pig iron as his finished produce; then from pig iron steel is produced and so on. Thus manufactures, without countless duplications, produce \$8,000,000,000 per annum; agriculture, without duplications, produces \$4,000,000,000; and mining, \$1,000,000,000, about equally divided between metallic and non-metallic products. Does it follow that manufacturing is eight times as important as mining? I think not. Without the product of the mine, manufacture would dwindle into insignificance. I repeat, that the importance of an industry is not to be determined by its apparent productiveness.

Then again, all our industries—agricultural, manufacturing, mining—are dependent upon our markets. We have the greatest and the best home market in the world. I would not trade our home market for the market of the balance of the world. We produced thirty-five million tons of iron ore last year—one-third of the world's product; we produced fifteen million tons of steel, and the most marvelous aggregation of manufactured products the world has ever seen, exceeding that of any other two countries on the map by more than two thousand million. And what did we do with it? We consumed it largely ourselves. Thus it is our consumptive capacity, as well as our productive capacity, that has made us wealthy. They make a mistake who think all we need to do is to produce. It is equally important that our people consume.

Coming up on the train I was telling some friends that one day I had examined some high-priced china plates just to see what other people could have that I could not. I asked them to guess the price. They staggered when I told them they were valued at \$6,000 a dozen—\$500 a plate. Then one member of the company suggested that it was an outrage that men should eat from plates like that, that it was a waste of money. For my part I am glad that people who have a superabundance of money will buy that class of plates, and I will tell you why. The man who produces those plates sends to this country and buys meat and bread. We get his money. Then the farmer who sells his meat and bread buys some manufactured products, and the manufacturer buys of those who dig the iron and coal and the iron and coal miner again buys food of the farmer. What we sometimes term the extravagance



of the wealthy works to the advantage of the humblest toiler. I can remember when cut flowers were a drug on the market. I do not know what the cut flower industry is now worth, but it is certainly worth many millions. And what are cut flowers? Simply God's sunshine plus labor. And what does the laborer do with the proceeds of cut flowers? He becomes a consumer of food products and manufactured products, and again the miner is benefited by those who buy cut flowers. You will observe that the burden of my talk is to show that our various industries and occupations are interdependent.

We have the advantage over the balance of the world in our mining industries. It can scarcely be said that we mine coal; we simply dig coal. We do not mine iron; we scoop it up. I visited what was called an iron mine not long ago, where the train passed along the side of a mountain range, and I could see iron ore extending twenty feet above the tracks, and they told me it was ore for twenty feet below the tracks. It was several miles wide and a hundred miles long. All they had to do was to get a car on the track, fix a chute, loosen the ore and let it slide into the car. Right over across the way was a great bed of coal. A man standing at the blast furnace with a modern gun would have within his range the men at the iron mine, the men at the coal mine, and the men at the limestone quarry in the valley between. This is bringing the essential elements very close together. There is nothing in the world to compare with it.

And now I want to speak for a moment of the necessity for additional markets. I consider myself a young man yet, but I can remember very well when this government undertook to develop the markets of the western half of this country. To this end it granted aid to transcontinental railways. For the purpose of developing the markets of this country, the government makes large appropriations for the improvement of rivers and harbors. For the purpose of increasing our markets, quite as much as for the purpose of increasing our products, the government has granted aid in irrigating the semi-arid belt. To the south of us are markets worth a billion dollars, and we secure ten per cent of them. For instance, we buy from Brazil forty per cent of all she has to sell, and we sell her ten per cent of what she buys. In my judgment, if we keep our mines running, if we keep our factories running, if we keep our labor employed, we must have a care for the markets that legitimately and logically belong to us. If we secure our share of the trade of South America, South Africa, and the Islands of the Pacific Ocean, we will need direct communication. We will never have this direct communication until we have an American merchant marine and we will never have an American merchant marine until the government in some form—in some way, gives some encouragement to the enterprise. It is the only industry that has not been and it not in some manner fostered by the government.

I would not like to have you go away under the impression that in order for the government to be of any assistance to the mining industry of the country, congress must create a Department of Mining with representation in the cabinet. Congress created a Fish Commission, and it has recently become a bureau in the Department of Commerce and Labor. Congress created an Interstate Commerce Commission, which is not connected with any regular department. It has no representation, directly or indirectly, in the president's cabinet. Formerly there was in the Treasury Department a bureau in charge of steamships, known as the Steamboat Inspection Service. It has since passed to the Department of Commerce and Labor. Under that bureau the government inspects every piece of material that goes into the construction of steamships, and every vessel is annually inspected and its safety approved. The Geodetic Survey, in the interest of commerce, surveys all our coasts and marks every rock and every reef. But none of these bureaus are

directly represented in the president's cabinet. Without expressing an opinion as to whether congress should create a Department of Mining, with representation in the cabinet, I want to assure you that a bureau of mining in the Department of Commerce and Labor would be able to do very much, and perhaps all that it is possible to do for the great interest here represented.

MR. MARTIN, OF SOUTH DAKOTA: I am sure that this gathering would esteem it a privilege to express to some extent the pleasure we have had in the visit of the secretary among us. He has turned aside from the busy work of a cabinet officer to come a long way to take part in our deliberations and exercises and upon his arrival and several times since, the secretary has stated to me, with some regret, that he had nothing to talk about upon this occasion. In passing I would like to express a wish that we may all have an opportunity to hear him at some time when he has something to talk about (Applause) and so, as he must depart this afternoon, I move to extend him a rising vote of thanks for the honor he has paid us.

The motion was stated by the president, duly seconded and a rising vote of thanks and three cheers were unanimously extended Secretary Shaw.

MR. SELBIE, OF SOUTH DAKOTA: Mr. Shaw stated he was not a member of this association. He has shown so much knowledge of mining and has stuck so closely to the subject that I think we ought to elect him an honorary member of this association.

The motion was duly seconded.

The motion was stated by the president and unanimously carried.

PRESIDENT RICHARDS: You will now have the pleasure of listening to a short address from Mr. Brown of Colorado on "Governmental Statistics."

COL. ED. F. BROWN: Mr. President, Ladies and Gentlemen: From the program that was published this morning I feel that you may think that I was to present a lot of statistics. I do not intend to do so, but have taken this opportunity of presenting a question to the Honorable Secretary of the Treasury, and hope that he will consider our greetings.

This country in the first hundred years of its existence grew great, powerful and rich through the great natural resources we had in agriculture. That century has passed. As he has explained to you, the foundation of manufacturing prosperity rests on mining, which is a fact; but it appears that at Washington, through some reason or other, they have continued in error all through the line of statistics that has been published in regard to the mining industry and we want to call attention to that error and, if possible, have it corrected. As I say, the first hundred years of our prosperity have come from agriculture. If we expect to maintain this great progress that we are now carrying on, it is necessary for us to become a greater manufacturing nation and meet all the world in that line. To do so, the mining industry is essential to our success. We have grown very great in this way. I can see from what the secretary has said that very few people understand and a great many people do not understand the extent that mining now has attained in this country, but let me call your attention to the report of the Interstate Commerce Commission of 1901, the last that was published.

There are 521,337,833 tons of freight given to the railroads of this country by that report and the products of agriculture amounted to 56,102,838 tons; the products of animals, 15,145,297 tons; the products of the mines, 269,372,556 tons; the products of the forests, 60,844,933 tons; products of manufactures 71,681,178 tons; merchandise, 21,697,693 tons, and miscellaneous, 26,493,338 tons. The product of mines furnished 51.67 per cent of all the business fur-



nished the railroads in the United States. (Applause.) The products of agriculture but 10.76 per cent; the products of animals, 2.91 per cent; forests, 11.6 per cent; manufactures, 13.75 per cent; merchandise, 4.16 per cent, and miscellaneous, 5.08 per cent.

Now when you take into consideration all those figures with the statistics published by the Treasury Department in regard to our exports you will find a most remarkable difference. Last year was the most prosperous year in the United States in the way of exports. The Treasury Department reports \$1,392,201,637 as being the gross exports for the year ending June 30, 1903. Of this vast amount of exports \$873,285,142 was credited to agriculture, \$408,187,207 to manufactures; \$38,814,759 to mining; \$57,830,773 to forests; \$7,755,232 to fisheries and \$6,328,579 to miscellaneous. Agriculture is credited with 62.72 per cent of all exports. Mining only is given credit for 2.79 per cent. Now that is not a fact. It is a mistake that has been carried for twenty years in the department at Washington. I have had correspondence with statisticians there in regard to it and they practically told me it had been going on so long that they could not change it. There were exported in copper ingots and bars \$37,354,061 worth; coal, \$21,206,498; mineral oil, \$6,329,899, and mineral oil refined, \$60,357,519, and other mining products making an aggregate of \$141,241,602 that should be credited to mining, and instead of the exports being 2.79 per cent really is 10.15 per cent.

Now how does this thing come about? Through an error that was commenced years ago, refined mining products, copper ingots, etc., was classed as manufactured products exported. Now what is a copper ingot? It is nothing more or less than the concentration of the copper into form for future use. A barrel of flour is nothing more or less than ground up wheat and is as much a manufactured product as agricultural product, but the ingot of copper certainly is not a manufactured product. There is as much sense in putting refined oil and copper in manufactures as there would be to call a gold bar a product of manufacture instead of mining.

You can all see that this error has been continued and we want to have it attended to because it changes the averages that would appear from year to year and increase the showing of mining exports. If a mistake has occurred let us correct it so that mining will get the credit of what it does. I have taken the pains to figure out those things in agriculture that are just as much a manufactured product as these two items I have mentioned and there are many others here which I have on the statement, and in case that rule is applied to agricultural exports it would eat up \$274,637,475 from agricultural exports.

In such matters as this we, as miners, only want the credit that really belongs to us. We have no objection to sawed lumber going in as forest products, although it is as much manufactured as an ingot of copper would be, or a bar of lead. We have no objection to canned salmon going in as fishery products, although it certainly is as much a manufactured article as an ingot of copper or bar of lead. We have no objection to any of these other industries getting the benefit of what they produce, but is it right to pick out the mining industry alone and report that of all our vast exports there are 2.79 per cent derived from the product of mines, when the face of their own report shows \$141,000,000 instead of \$38,000,000?

I feel that this is a matter that this association should take cognizance of. I thought it was proper that this was the place we should present the protest and in consideration of that fact I have prepared a resolution which I will hand to the secretary. It has not been my intention to make a speech. It has only been my intention to make this kick that I have made for at least five or six years and I would like the association to support me in the position I have taken. (Cheers.)

The following is a detailed statement of Col. Ed. F. Brown, of Colorado, referred to by him in the preceding speech:

Statement showing the proportion of business furnished the railroads of the United States by the different industries. Extract from Interstate Commerce Commission report for 1901. See page 66.

	Tons.	Per Cent.
Products of Agriculture .....	56,102,838	10.76
Products of Animals .....	15,145,297	2.91
Product of Mines .....	269,372,556	51.67
Product of Forest .....	60,844,933	11.67
Product of Manufactures .....	71,681,178	13.75
Merchandise .....	21,697,693	4.16
Miscellaneous .....	26,493,338	5.08
	<u>521,337,833</u>	<u>100.00</u>

The following articles were credited to agriculture although manufactured more or less:

Bread and Biscuit .....	589,536
Oat Meal .....	1,839,106
Rye Flour .....	12,818
Wheat Flour .....	73,756,404
Table Food .....	2,667,409
Bran, Middlings, etc. ....	945,053
Dried Grains and Shorts ..	1,320,065
Other Manufactures .....	661,131
Roasted or Prepared Coffee ..	2,381,469
Dried Apples .....	2,31,469
Dried Apricots .....	713,887
Pressed Fruits .....	1,806,328
Prunes .....	3,512,507
Malt .....	252,801
Oil Cake and Meal .....	12,732,497
Beef Products .....	7,916,928
Beef Products .....	25,013,323
Salted Pickled Beef .....	3,916,855
Tallow .....	1,623,852
Hog Products .....	22,178,525
Hog Products .....	25,712,633
Hog Products .....	1,369,687
Hog Products .....	11,995,253
Lard .....	50,854,504
Lard Compounds .....	3,607,542
Mutton .....	532,746
Oleomargarine and Oleo .....	12,780,161
Butter .....	1,604,327
Cheese .....	2,250,229
	<u>274,637,475</u>

If agricultural and other exports would be reported same way that Mining is returned, the following would be the result:

Agriculture .....	\$598,647,667	43.00 per cent.
Manufactures .....	742,838,254	53.36 per cent.
Mining .....	38,814,759	2.79 per cent.
Forest .....	4,506,728	.32 per cent.
Fishing .....	1,065,710	.07 per cent.
Miscellaneous .....	6,328,519	.46 per cent.
	<u>\$1,392,201,637</u>	<u>100.00 per cent.</u>

Report of Treasury Department giving the classification of exports for 1902-1903.

Agriculture .....	\$873,285,142	62.72 per cent.
Manufactures .....	408,187,207	29.32 per cent.
Mining .....	38,814,759	2.79 per cent.
Forest .....	57,830,778	4.15 per cent.
Fishery .....	7,755,232	.56 per cent.
Miscellaneous .....	6,328,579	.46 per cent.
	<u>\$1,392,201,637</u>	<u>100.00 per cent.</u>

In the same report the following articles are specified as having been exported:

### EXPORTS OF MINING PRODUCT.

Brick .....	\$ 429,908
Cement .....	419,361
Coal .....	21,206,498
Coke .....	1,912,459
Copper ore .....	927,417
Copper ingots and bars .....	37,354,061
Phosphates .....	6,344,224
Iron ore .....	266,982
Pig iron .....	362,068
Ingots and blooms .....	68,064
Lead pizo and bars .....	15,527
Lime .....	32,694
Marble, stone and slate .....	1,565,244
Nickle and matte .....	864,221
Mineral oil .....	6,329,899
Mineral oil refined .....	60,357,519
Mineral residium .....	566,115
Quicksilver .....	762,201
Salt .....	70,446
Zinc .....	1,386,694

\$141,241,602

If corrected the statement should read:

Agriculture .....	\$873,285,142	62.72 per cent.
Manufactures .....	305,760,364	21.96 per cent.
Mining .....	141,241,602	10.15 per cent.
Forest .....	57,850,778	4.15 per cent.
Fishery .....	7,755,232	.56 per cent.
Miscellaneous .....	6,328,519	.46 per cent.
	<u>\$1,392,201,637</u>	<u>100.00 per cent.</u>

Memorandum showing value of mining products that swelled the balance of trade:

Excess of gold .....	\$ 2,108,568
Excess of silver .....	20,068,768
Exports above .....	<u>141,241,602</u>
	<u>\$163,436,938</u>

PRESIDENT RICHARDS: The Secretary will read the resolution offered by Col. Ed. F. Brown.

Secretary Mahon read the resolution.

PRESIDENT RICHARDS: Under the rule it will be referred to the committee on resolutions through the secretary.

GEORGE, OF SOUTH DAKOTA: I desire to introduce a resolution asking the United States Congress to enact a law to establish mining stations, to aid in the development of the mineral resources of the United States, and for other purposes.

PRESIDENT RICHARDS: The secretary will read the resolution. Secretary Mahon read the resolution.

PRESIDENT RICHARDS: The resolution will be referred to the committee on resolutions.

GEORGE, OF SOUTH DAKOTA: I wish to state to everyone in the convention that there are copies of the resolution in the form of a bill on the platform and anyone who desires may read it.



**PRESIDENT RICHARDS:** The chairman of the finance committee has a report to make relative to the finances of the American Mining Congress.

**RUSSELL, OF SOUTH DAKOTA:** This report is presented in pursuance of resolutions of the executive board. I will say that it has been examined and audited by the executive board and found correct. However, all vouchers and all accounts are, in pursuance of that resolution, open to the scrutiny and examination of any member of the association, and if it is desired that a committee shall be appointed to examine and audit the account further, the executive committee would be pleased to have it done; and at this time and in this connection I would desire to say to the Congress on behalf of the executive committee that we feel that at this time and in this session some steps should be taken in order to place the Congress on a more substantial basis than it is. The plan as proposed, which will come up under the proposed by-laws, provides for a membership from which we have hopefully looked for a large income. I regret to say that so far delegates and visitors to the Congress have not to any large degree taken out the membership that we expected. I will say, further, that the Black Hills men have taken just about half of the membership of the Congress so far. It is earnestly desired that the delegates, if they feel interested enough to continue as members of the Congress, should take out their memberships at this time, and further, it is hoped that the Congress will devise means that will place the Congress on a more firm and substantial basis.

The report was read and is as follows:

Cash received and deposited with Treasurer Goodale from September, 1902, to September 1, 1903:

Received account of members .....	\$1,349.00
Butte Business Men's Association .....	355.00
Black Hills Mining Men's Association .....	3,000.00
Ex. Treasurer Camp .....	101.05

Total.....\$4,805.05

#### DISBURSEMENTS

Sec. Mahon on account of salary.....	\$ 625.00
Bond of Treasurer Goodale.....	25.00
Butte Miner for publishing proceedings.....	355.00
Lead Daily Call for publishing proceedings.....	448.00
Miscellaneous expenses .....	2,934.36

Total.....\$4,387.36

Balance.....\$ 417.69

**MR. BUCKLEY, OF MISSOURI:** Mr. President, I wish to move you that the proceedings of this Congress be governed by "Roberts' Rules of Order" until the proposed constitution and by-laws be adopted by this Congress.

**MR. PATTERSON, OF NEBRASKA:** I second the motion.

Which motion was stated by President Richards and duly carried.

**PATTERSON, OF NEBRASKA:** The chairman of the committee on credentials will be pleased to meet the other two members at seven o'clock at the Franklin hotel, and will also be pleased to receive any credentials that are not yet turned in before that time.

**TARBELL OF COLORADO:** As a member of that committee on credentials would it please the chairman to meet directly after this session?

PATTERSON, OF NEBRASKA: Yes, sir. Then the credential committee will meet at the Franklin hotel immediately after the adjournment of this session so that you can find your committee there to present your credentials to.

LYNCH, OF MONTANA: I move we now adjourn until eight o'clock this evening.

JACKSON, OF IDAHO: I think the gentleman will withhold his motion after what I am about to suggest. There is a matter overlooked, it seems to me, surely not from intent but simply a matter of oversight. It seems to me we have failed in doing our duty by failing to vote a vote of thanks to the president of the United States for recognizing this Congress and the mining industry by sending a member of his cabinet here.

LYNCH, OF MONTANA: The motion to adjourn is withdrawn.

JACKSON, OF IDAHO: Then, Mr. Chairman, inasmuch as the great lamented immortal president during the time of the rebellion, Abraham Lincoln, sent his congratulations to the miners of the West who were digging the gold to pay the debts and to carry on the commerce of this country at that time, "Boys, go and mine and we will help you the best we can," and as President Roosevelt has said, though not in so many words perhaps, but by acts when he sent his representative of the cabinet to this Congress in recognition of it and the mining industry—Gentlemen, when he said, though not in so many words: "Advance your mining industry; boys, go on and push your mining industry; advance your Mining Congress; the president of the United States recognizes your effort; the government of the United States recognizes your efforts, and the government will assist you in all worthy purposes in this connection"—Therefore I move you, Mr. Chairman, that a committee of three be appointed, of which the secretary of the Congress shall be the chairman, to prepare a resolution voting the thanks of this Congress to the president of the United States for his recognition of the mining industry and of this Congress in sending his representative here, the secretary of the treasury, at this time. Let the resolutions be engrossed and mailed to President Roosevelt so that he may never forget the gratitude of this Congress, as this Congress will probably never forget that it was recognized and the mining industry was recognized as in this case.

SECRETARY MAHON: I thank the gentleman from Idaho for the compliment that he has so gracefully paid to me here today in mentioning my name as the chairman of that committee. I would be glad and proud to serve upon it did I think it the proper thing for me to do. That duty belongs to the gentleman who has offered that motion and I hope Mr. Chairman, that you will insist upon his taking his proper place. (Cheers.)

DIGNOWITY, OF PENNSYLVANIA: I second the gentleman's motion.

PRESIDENT RICHARDS: It has been moved and seconded that a committee of three be appointed by the chair, of which our secretary shall be the chairman of that committee, to express by resolution by appreciation of the president's act in sending his secretary of the treasury to meet with us on this occasion. Are you ready for the question?

JONES, OF CALIFORNIA: I desire to move an amendment that instead of the secretary being the chairman of that committee it be the gentleman from Idaho who made the motion.

PRESIDENT RICHARDS: If there is no objection we will consider it so amended.



**PRESIDENT RICHARDS:** The question is now shall the chair appoint a committee of three, of which Mr. Jackson, of Idaho, be chairman, to express by resolution our appreciation of the president's act in sending his secretary of the treasury to meet with us on this occasion?

Which motion was unanimously carried.

**SECRETARY MAHON:** There has been no motion carried to adjourn and we have some little time to spare this afternoon. There is a gentleman here from North Dakota who is very familiar with the early history of this country and who is willing to give us a little talk of about five or ten minutes if agreeable to the Congress.

**PRESIDENT RICHARDS:** We will listen to a few remarks by Mr. Russell at this time.

**MR. RUSSELL, OF NORTH DAKOTA:** Mr. President, Ladies and Gentleman: It was very foreign indeed to my expectation when coming here to be asked to address you, but as I sat here this afternoon memory has gone back thirty years. In 1873 it was my privilege to go across the territory of Dakota. The Northern Pacific railroad had constructed their road to the Missouri river in the early part of 1873. The secretary of the interior, a member of the cabinet of President Grant, was very anxious to see Dakota as it was known then. The Northern Pacific road gave him a special train for himself and his friends and I was requested, living as I was then at the head of Lake Superior, to be his escort to Bismarck on the Missouri river. I sat here this afternoon and memory has gone back thirty years. We slept at Fargo that night; we crossed the territory of Dakota from the Red river to the Missouri by daylight. The census of 1870, two years and a half or nearly three years before we made the trip, which was in July, 1873, of the territory of Dakota showed 14,181 people. I have got those figures correct for I have been called upon to verify them once before, 14,181 people. Of that we knew thoroughly that that part which is now North Dakota did not contain over 1,000; we did not know how many, but the territory was undivided of course. The larger portion of the 14,000 was in South Dakota. As we drew near the Missouri river that afternoon the secretary said these words: "I am exceedingly glad to see Dakota. I have looked forward to it with a great deal of interest for a number of years. Now," says he, "we have traveled today over a territory that is capable of and going to sustain a very large population to the square mile in the distant future," and he expressed it with very strong words. "We have not seen a particle of soil cultivated for we don't know there is a hundred acres cultivated between the Red river and the Missouri. We have not seen any farms but we have seen a soil here that is deposited that is capable of sustaining a very large population to the square mile." Says I: "That population unquestionably as you say may be sustained here, but what will they do for fuel? What will they do for lots?" His reply was this: "It is not consistent with the wisdom of the Almighty God to place such a soil as we have seen here today the proof of which we have by the grasses that we have seen and the depth of the soil through the cuts which we have passed show; it is not consistent with His wisdom to leave that population without supplying them with everything that is necessary for their sustenance, and you will no doubt find under the prairies here bodies of fuel and most unquestionably oil that will furnish both fuel and light." And when the lignite fields of North and South Dakota were discovered that prophesy of Delauney came forcibly to my mind. We did not know anything at that time except vaguely of the Black Hills. The twenty-fifth year has been passed by me as a resident of North Dakota. In 1870 the population of the territory was 14,181 Thirty years afterwards, in 1900, the population of North and South Dakota was 723,000 and over. It is more since that time, as you



will all bear witness. It is safe to say that it is now 800,000. How that English speaking race has gone forward and possessed the soil that Mr. Delauney, of Ohio, said was capable of containing a large population to the square mile! We went from Bismarck to Fort Lincoln the next day. The officers of the fort gave the member of the cabinet a beautiful reception. They showed us the sand banks thrown up there to protect them from an attack of 300 warriors of the Sioux Indians only sixty days before. Where is the Sioux Indian? Where is the buffalo that fed the Indian? What has taken the place of the Buffalo and Indian? The English speaking races, carrying their churches and their schools with them, their manufactures and obtaining the wealth of the soil of North and South Dakota, South Dakota here in the Black Hills digging it from the bowels of the earth and North Dakota raising it from the surface, and now producing a very large part of the wheat of the world.

Ladies and Gentlemen, there is only one expression that I can satisfy my own mind with as I look upon what has been done in the last thirty years. What has God wrought! May God in His infinite sympathy continue all blessings to the people of North and South Dakota to the end of time, and may all our efforts be spent in developing the resources of these states.

LYNCH, OF MONTANA: Mr. Chairman, I will renew my motion that we now adjourn until eight o'clock.

TARBELL, OF COLORADO: I second that motion.

The motion was carried and Congress adjourned until September 8, 1903, at eight o'clock P. M.

Deadwood, S. D., September 8, 1903, 8 P. M.

PRESIDENT RICHARDS: Let the Congress be in order.

PRESIDENT RICHARDS: The first thing on the program for this evening is an address by Dr. J. W. Abbott of Denver, Colorado; subject, "Good Roads for Mines." (Applause.)

#### GOOD ROADS FOR MINES.

DR. J. W. ABBOTT: Mr. President, Delegates to the American Mining Congress, Ladies and Gentlemen: The opportunity to address the American Mining Congress on this important subject I count as the greatest privilege of my official career. (Applause.) I represent that division of our national government which deals with problems of highway improvement. It has been in operation only ten years, and has had to work with ridiculously meagre appropriations, hesitatingly made. That section of our constitution which imposes upon congress the duty of "providing for the general welfare" has always seemed much clearer of comprehension when money could be appropriated for the direct benefit of specific localities, where watchful and discerning constituents can exercise the right of suffrage in behalf of zealous and successful representatives.

The material development of our country has produced both anomalies and paradoxes.

It is indeed an anomaly that while in every other phase of civilization in the home, the office, the city, on rail and water, we lead the world's progress, the general standard of maintenance and construction for our common roads has remained stationary during the past hundred years. The lumberman hauls his logs, the farmer his cotton, wheat and corn, and the miner his machinery, supplies, coal and ore over roads no better than those used by his forefathers a century ago.

It is a no less striking paradox that the old world countries have splendid roads because they cannot afford poor ones, while our material resources have been so abundant that we have been bearing year after year the appalling loss from bad roads without realizing the drain. From abundant data gathered in all portions of the United States by the office of public road inquiries, it was demon-

strated years ago, and has been signally confirmed by my own investigations, that the cost of wagon freighting under average existing conditions is, approximately, 25 cents per ton per mile. It is also interesting in this connection to note that the contract price (determined by very earnest competition) paid in 1901 by the government for hauling supplies in Yellowstone National Park, where the mountain road system is of a very high standard, was 25 cents per ton per mile. In gathering statistics of the cost of freighting to and from mines by wagon roads, I have found several instances where the roads were the best in which this average cost figured exactly 2 cents per ton mile. I have found none in which the rate was even a fraction lower. Climate, the price of labor, hay and grain, volume of material to be handled and the newness, or otherwise, of the mining region, are all, of course, factors in determining this cost of wagon freight. But the one factor which always controls, and which over-shadows in importance every other, is the character of the road. I have in mind a mining camp situated far below timber line, distant eighteen miles from a populous, thriving agricultural center and important railroad point, where the established freight rate each way is \$12.00 per ton; 66 2-3 cents per mile. At no place along the line is the rise exceedingly rapid, but the grade in places is so very steep that 3,000 pounds is an average load up for a six-horse team.

At the request of the Department of Agriculture, on November 20, 1895, a circular letter was addressed to many consuls in European countries, requesting information similar to that already elicited in this country on the cost of hauling farm products. A very large number of reports in answer to this circular were received and published. They show costs ranging from 6 to 13 cents per ton-mile for hauling different products under different conditions. While no certain general average cost per ton-mile can be adduced from these figures, anyone who studies them will conclude that it lies between 10 and 12 cents. With reference to the question whether this light cost in Europe is not partially due to lower prevailing standards of wages, it may be said that while wages there are somewhat lower than with us, the cost of feed averages considerably higher; that very much of the hauling in Europe is done with one horse or mule, while all the data from which the American average was adduced assumed one driver for not less than two horses.

Assuming the cost of hauling at 25 cents per ton-mile and taking figures for production from census returns, the director of the office of public road inquiries in April, 1896, estimated the grand total cost of hauling on the public roads of the United States at about \$950,000,000. Had these roads been constructed on European standards, this cost would have been reduced more than one-half.

For the same year covered by this estimate, the gross freight receipts of all the railroads in the United States was less than 730 millions of dollars.

It is only by some such comparison that the mind can grasp the significance of these figures of annual waste, which, although they equal the entire amount expended since its beginning by the government on improvements to rivers and harbors, does not fully measure the appalling loss to this country from its defective highway system. We must add a great many millions for perishable products spoiled because they could not reach market in time, the restriction or congestion of railroad freight, due to closed roads and their subsequent opening (because of climatic conditions), the failure to reach market when prices are good, the enforced idleness of vast numbers of men and animals, the limitation to the area of profitable cultivation of the soil or exploitation of the ground, and many other adverse results due to prevailing highway conditions.

But it is particularly to the effect upon the mining industry that I desire to call special attention. The tonnage involved in mining operations is always very great. The machinery required for mine



and mill equipment runs into tonnage alarmingly fast in the very large majority of cases. All material of all kinds which enters into this equipment must be transported a greater or less distance over a common road. In the beginnings of most mining enterprises the product, as well as all needed supplies, including fuel, must be hauled in wagons. Whatever this wagon haul costs more than it would cost over properly constructed roads is a tax to be deducted from possible profits. Take a mining enterprise that requires an average wagon haul of twenty tons a day for 300 days in the year; supposing that improving the road would result in a saving of but 25 cents on each of these tons; this means \$5.00 a day or \$1,500 for the year, which is 10 per cent on \$15,000. Twenty tons a day for supplies and product does not mean a large business, while \$15,000 will, if intelligently applied, work a vast change in almost any road which serves mining needs. All of us who are familiar with mining methods as they actually are in the United States will recall instances without number where an awful drain upon the net output has been suffered year after year without apparent effort for relief, and in many cases even without protest.

The annual product from the mines of the United States has a money value of more than one billion dollars. The amount which is expended annually to cheapen the transportation of these products by rail and water, and for mechanical devices of all kinds by which they may be placed upon car or boat or removed therefrom, is prodigious. Isn't it an anomaly that with almost insignificant exception, no effective study is given to this waste in wagon freighting? Compare existing practice in this respect with what the railroads are doing. Grades are being cut down, curves lightened, tunnels bored, heavy steel rails substituted for the lighter ones, more capacious cars and more powerful engines purchased, and every method practiced to reduce the cost of transportation. In the 1901 report of the Pennsylvania Railroad Company will be found some very interesting pages bearing upon what has been accomplished along this line. In 1865 the average cost of hauling each ton of freight one mile was practically 2 1-3 cents, and the average profit 3-8 of a cent. In 1901 the average cost of the haul had been reduced to 3-8 of a cent, and the average profit had fallen to 1-5 of a cent. You see that by the improvements effected the cost of the haul had been reduced to one-sixteenth of what it formerly was. As demonstrating the critical need for this economy, appears the profit on the transaction which has decreased to a less figure than it was when the cost was so much greater. Mr. James J. Hill, the most far-sighted practical economist who has ever studied transportation problems, is now equipping the largest ocean freight carrier ever built upon this continent. It will require the contents of more than one thousand freight cars of average capacity to furnish a load for each. In order to operate these monsters of the sea in successful competition with the subsidized steamships of other countries and the subsidized railways of Canada, this enormous tonnage must be hauled in both directions at rates so low that the returns per ton-mile will be even less than the figures given above for the actual cost of freight transportation on the Pennsylvania railroad. The steamers must run fully loaded each way, and to command this huge bulk of freight, a smaller fraction of a mill per ton-mile must be accepted than ever before for a similar service. When we consider that it has been during the life of one generation that the cost of rail transportation has been reduced to less than one-sixth of what it was, and the cost of steamship transportation probably fully as much, does it not seem strange indeed that we are contented to go on in the same old way when hauling the same products over the common road?

But the loss resulting to the mining industry from unsuitable roads is by no means confined to regions where there are actually developed mines. The wealth still hidden in the almost impenetrable fastnesses of our Western mountains probably far exceeds all that

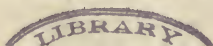


has ever yet been disclosed. The intrepid prospector and his faithful burro outline the primitive trail into each new Golconda. These trails in turn give way to pathways which it is generally euphemism to dignify as roads. These roads gradually develop into great arteries and money is often poured out with spontaneous and unreasoning recklessness to open a new mining camp. A tithe of what is thus squandered, with results as evanescent as a passing dream, would build roads, with whose coming would vanish the main terrors and hardships which mark the early history of nearly every new mining camp. Prospects which, if accessible by good roads, would tempt capital and be developed quickly into new mines, lie idle year after year and decade after decade, solely because there is no way by which they can be economically equipped and operated. What pitifully short-sighted economy, counties, hoping to make such prospects accessible, build roads leading to them, located with such steep grades and in such improper places that the cost of hauling over them soon becomes manifestly impracticable. They actually defeat the very purpose for which they were built because the fact that some kind of a road is already built makes it ten times more difficult to raise the means to construct another along correct lines. The man who exerts his influence against the building of a road which must inevitably prove unsuitable, confers a greater benefit upon a mining region than he who subscribes himself and induces his neighbors to do likewise for a kind of road which effectually disappoints the very hopes which it at first encouraged. Many a mining enterprise of real potential merit has been irretrievably wrecked because an expensive and appropriate equipment has failed to produce a paying mine where wagon transportation has been so excessive as to consume the profits, until hope, too long deferred, has yielded to disgust and a fatal discouragement. It is only through economy and by the most careful methods that a very large percentage of mines have been made commercially successful. Is it not just as important to look carefully after that portion of the expense which goes into wagon transportation as it is to hoist cheaply, to drill effectively, to ventilate properly or to save the ultimate nickel by elaborate metallurgical methods?

It is not my purpose, nor do I conceive that it would be appropriate for me in this paper, to go deeply into the technical principals of correct road building for mines. In the issues of the Engineering and Mining Journal, of New York, for May 16-23, last, appears a paper which I prepared with much care, dealing with this phase of the subject. In the year book of the United States Department of Agriculture for 1900 there appears a paper upon mountain roads, written by myself, which, while it does not contain some things which I conceive to be valuable for the engineer who is constructing mining roads, does touch upon certain features of mountain roads not so fully elucidated in the paper first mentioned. This latter paper on "Mountain Roads" has been re-published by the department in pamphlet form and is furnished gratuitously to anyone upon application.

The fundamentals of any mountain road construction are grade and drainage. From quite an extended observation and experience in mountain road construction and in mountain freighting, I have reached the very positive conclusion that under no circumstances, on any road designed for general freighting, should there be a grade exceeding 12 per cent. I further believe that no distinct economy is secured by reducing mountain grades, at much cost, below 8 per cent. This latter conclusion, reached by myself solely from experience and observation, has been confirmed by traction experiments made by the government and by individual engineers.

Of course, the most difficult places upon any road where trail wagons are not used, determines the load which can be hauled. The



engineer who is locating a mountain road should determine in his own mind, from all the circumstances in the case, what his maximum shall be, and when he has once determined it, should adhere to it inflexibly in making his location.

Grades should always be eased and the road bed widened on curves and the approaches to every sharp curve should be level.

It is much easier to drain a road on a side hill than one located along the bottom of a gulch. Roads facing the east and south dry out more quickly after wet than those which face the north and west.

A side hill road should always slope towards the inside bank and never towards the outside; otherwise the tendency will be for the outside of the grade to get lower and the inside higher, until it becomes dangerously sidling.

The essential principles of mountain road construction are few and simple. The main need is common sense and the power to reason clearly. Technical training is valuable, but not a *sine qua non*. If every mining man would get these principals firmly fixed in his mind and whenever he rides over a road would mentally inquire "Is the road here rightly built? How could it be made better?" The beneficial results to the industry would be quickly apparent. Out of such habit would come discussions and a general influence for better methods and higher standards.

The need for improved highways is the great question today which concerns every locality, every interest and every person throughout the entire length and breadth of this nation. The other stones in the principal march of our material progress are in place. The keystone which is to complete it into a symmetrical structure of strength and beauty is being rapidly shaped in the quarry of public sentiment. Day by day its outlines become more clearly defined. The powerful machinery of selfish interest and promise of immediate pecuniary return to the individual worker, which has rendered such effective aid in fashioning and lifting into place the other stones in this edifice is lacking. This must be wrought to completion and raised into position by the willing hands of all the people. Each interest must contribute its equitable share of aid.

The Good Roads Propaganda has been successful in awakening the people generally to the overshadowing importance of the subject. The apathy of ten years ago has almost entirely vanished. "We must have better roads," is the universal cry. Everywhere now people are earnestly studying ways and means. In nearly every state, at each recurring session of the legislature, bills are considered and many passed, appropriating state funds for roads and establishing methods for securing more effective results. In the older and more populous states highway commissions have been created to supervise the expenditure of state funds. In every state which has such commission the law provides that the state funds shall cover only some portion of the entire expense of the roads to be built. In New York the state pays one-half, the county 35 per cent. and the road district 15 per cent; in New Jersey the state pays one-third, etc.

These laws mark the greatest advance yet attained in solving this question of ways and means. They give recognition to the very important principle that the cost of building a new road should not be borne solely by the immediate district through which it passes. Every new road built gives an added impulse to the state's prosperity. It increases the price of land, induces men to build better homes, invites home-seekers, adds to the profits of every industry, brings in new enterprises, enlarges bank deposits and promotes activity in all lines. The general industrial life blood pulsates more vigorously. City, county and state treasuries, each get a share of the increment and can well afford to contribute to that which produces it. As these results get to be better understood and appreciated the equity of dividing the burden is more cheerfully recognized.

Extending this principle of co-operation to its logical limit the advocates of road reform insist that the general government should



come in and assume its equitable portion of this burden of cost. The nation is a community of states. Whatever contributes to their prosperity helps to make it strong and great. The funds in its treasury come from the pockets of all the people. What else would more surely or more effectively "provide for the general welfare" than a policy of expenditure tending to improve highway conditions throughout the entire country? The proposition in itself is incontrovertible. The problem is to satisfactorily determine such policy.

Wherever in the United States today highway reform is being seriously and earnestly discussed "National Aid" is accepted as being the logical method of securing it. But what would be a suitable policy, fair to all sections, logical and effective and safeguarded against waste and theft?

Some plans advanced contemplate the building by the government alone of certain roads in selected localities, should be main arteries and by their superior excellence should serve as object lessons of correct methods.

These plans are opposed on many grounds. The millions upon millions of dollars worse than wasted under some (not all) river and harbor bills, are pointed to in proof of the error of any plan which opens the United States Treasury to log rolling deals.

Next winter there will be introduced into both houses of Congress bills designed to bring in the government as a co-operating factor with states, counties and localities. These bills will provide for the appropriation of a definite sum to be apportioned equitably among the states, the amounts thus apportioned to be expended in conjunction with equal amounts contributed by the states.

These bills will provide for apportionment directly according to population. Some favor apportioning half the amount according to population and the other half equally to each state, on the same basis as the states get representation in Congress.

The states must provide by law how their quota shall be raised; that is whether the state shall furnish it all, or the state a part and the county a part, and perhaps the locality another part.

All bills will provide that the money shall be expended under the direct supervision and control of expert road-builders in government employ, and the effort will be made to thoroughly safeguard the funds from waste, or speculation.

No industry could have greater interest in the solution of this question than mining. I appeal to every man within the sound of my voice to give his earnest attention and careful thought to this matter. We must have government aid in some form. We are entitled to it. We shall get it when the people demand it.

This is a movement that grows as its benefits become apparent. One good road brings another. We don't expect the government to help build all the roads, but we do expect it to help start us.

In the Western Mountain States spaces are great; population and money very limited. Good roads will help open our mines, increase our profits, extend the area of profitable agriculture and put us into position to better afford the outlay for roads. All sections need them, but these new regions relatively need them most. As illustrating the awakening on this subject in the older states it may be mentioned that the legislature of the State of New York at its last session passed a law for submitting to popular vote the question whether the state should issue fifty millions of long time bonds, the proceeds to be used for building improved roads. We expect New York to stand at the front in Congress in demanding government aid.

Let us not forget that we are not asking this as a favor nor as a function of paternalism, but because it is right. We must have the money to build them and we must call on all interests to contribute their share just as each man has to pay his individual tax. The Government is an interested party and we ask for it to do its proper share and to show how it ought to be done, just as it shows us how to raise grass on desert sands and to get best results from each particular soil.



It is a case of "United we stand" and that is what Government is for.

**PRESIDENT RICHARDS:** The next on the program is a paper by Dr. J. D. Irving, of Washington, D. C. Subject, "Ore Deposits of the Northern Black Hills." In the absence of Dr. Irving, Mr. E. R. Buckley, of Missouri, will read the paper.

**MR. E. R. BUCKLEY:** Mr. Chairman, Ladies and Gentlemen: It gives me very great pleasure to have an opportunity to read this very excellent paper by Dr. Irving, of the United States Geological Survey. I only regret that Dr. Irving is not here himself to read the paper for I am sure it will be impossible for me to do justice to the subject which he has so ably treated:

#### ORE DEPOSITS OF THE NORTHERN BLACK HILLS.

The Black Hills have been from the earliest time a region of singular economic interest. From the dates when Indian hunting parties visited them to obtain provisions for future use, they have gradually increased in importance as a source of wealth, until their production has seen its culmination in the thriving mining industries of today.

To the Indians the hills were merely a hunting ground, and the wealth which they derived from them was only in the form of provisions.

The gradual inroads of the hardy prospector to this Indian hunting ground first attracted attention to the region as a source of a different type of wealth. Rumors of the discovery of gold there, growing as they traveled further from their source, spread the impression that this was a land of great mineral wealth. The increase in the number of men visiting the Hills soon alarmed the Indians and brought about hostilities which eventually attracted the attention of the Federal Government. The story of how military expeditions were sent here, of how a party was finally sent out to investigate the truth of these rumors, of how gold was found there, of the final opening up of the country to settlement, and the gradual inception, rise and growth of the mining industry, is well known to all who are familiar with the history of the region.

In the several steps of its growth, mining in the Black Hills has followed quite closely the lines of its development in other regions. First, the attention of the early prospectors and those who followed them there, was given to the more easily accessible deposits, the placers. As the value of these became evident, search was made for the source from which the gold in the placers was derived. The old gravel deposits which lie at the base of the Cambrian formation were then found, and for a number of years yielded almost fabulous sums to those who had located upon them. The impregnated lodes in the schistose rocks were discovered, and the mines which have now become the famous Homestake belt were gradually opened up. The lead-silver ores of Carbonate then became productive, and still further search revealed the beds of refractory siliceous ores which have of late years become of such very great importance; then the Ragged Top ores were found, and finally a variety of smaller deposits was discovered. Regions where ore bodies were easily accessible at the surface were those first prospected, then those more remote and more deeply buried beneath the covering of barren rocks in turn yielded their contents to the efforts of the miner.

The members of the Mining Congress are spending a short time in this region. In presenting this paper to them it is the purpose of the writer to take up successively the different types of deposit occurring in the Northern Black Hills, and to make as clear as possible their character, their value, the geological association in which they are found, and to set forth in so far as possible, what evidence there may be as to the manner in which they have originated.

To make this discussion a little clearer, the general geological character of the Black Hills will be briefly described and then the different types of ore bodies which occur in the region will be severally discussed.

### GEOLOGY.

As a problem in geology, the Black Hills differs in some respects from almost any other to be found in this country. Surrounded on all sides by a flat and rather barren country whose general character is monotonous and without special interest, the Black Hills rise as an island, presenting within their borders geologic problems of great variety and interest, diverse types of ore deposits, and studies in land drainage, which, from their very isolation and circumscribed character, are easily grasped and understood, and are without the usual complicated connections with the surrounding country that make most geological questions so difficult to comprehend.

In his classic work upon this region, Henry Newton has described the general geological character of the Black Hills as an elevated area, roughly elliptical in outline, comprising a central core of metamorphic crystalline rocks, about which are grouped in rudely concretic belts, strata of later geologic age, dipping away in all directions from what is termed by Newton the elevatory axis or region of the Hills.

Where the strata which originally covered the core of schists which forms the center of the hills still present, we would have an elevated dome of very great height, rising far above the level of the surrounding country. The gradual erosion, or wearing away, however, of these uplifted rocks has gone on together with their upheaval, so that we have now remaining a country only slightly higher than the surrounding plains. In the center is the uncovered area of schists, and at the sides the stratified rocks dipping outward beneath the flat prairie land beyond. The general trend of this central core of old crystalline rocks is in a due north and south direction, but at its northern extremity it turns quite abruptly towards the northwest, forming a sort of geological cul-de-sac shut in on three sides by upturned strata, but separated from the main portion of the core to the south by a narrow belt of Cambrian rocks and their included masses of porphyry.

Throughout this northern area erosion has not cut so deeply into the crystalline schists as further south, so that besides the rude belt of enclosing strata, isolated patches of the old covering lie upon the higher hills within the area of schists.

If we examine the rocks which compose the different geological formations which are found in the northern hills, we shall see that there are four different groups of importance which can be readily distinguished from one another. The first is the lowest, or series of metamorphic schists. It consists of a series of crystalline mica-schists, mica-slates or phyllites, and laminated quartzites. Together with these are found, in the southern portion of the Black Hills, and in the region known as Nigger Hill, large intruded masses of granite, very coarse in its texture and sometimes containing deposits of tin. In the northern portion of the hills there is no granite present in the series, but its place is taken by numerous, dikes and great irregular patches of a dark greenish hornblende rock, termed amphibolite. Bodies of this rock are particularly noticeable in the vicinity of Lead City, and extend as far south as Custer Peak. It is possible that they may have had some connection with the occurrence of gold in the Homestake mine, but there is no definite evidence in favor of this theory. The rocks of this series are strongly laminated and are everywhere tilted at a high angle. The lamination crosses the planes of original sedimentary banding, as can be still seen in many places. Numerous closely spaced folds are also seen to exist in the series, but the high degree of alteration that the rocks have undergone has now almost completely obliterated their original structure.

The next series of rocks is that belonging to the Cambrian period, and comprises those rocks which lie upon the eroded surface of the



coarse bed of hardened gravel, a thick layer of quartzite, and a series of alternating limestones and shales with some quartzite, in all a thickness of about 400 feet. Above these and still further out from the center of the hills there is a yellowish limestone showing purple spots and belonging to the Salurian age. This is about 80 feet thick. Above it comes a series of very heavily bedded gray limestones, pinkish at the base and averaging about 600 feet in thickness. It covers the other rocks throughout the entire western portion of the uplift.

There are present, besides these sedimentary rocks, eruptive rocks of several different varieties. The most abundant of these are rhyolite, either fine-grained and white as in the vicinity of the Home-stake mine, or coarse-grained and darker colored as at other localities; syenite porphyries which occur chiefly in the vicinity of Deadwood and Two Bit Gulch; and phonolite. The latter is generally a dark greenish or bluish rock, sometimes quite coarse but usually exceedingly dense and fine-grained. Other intermediate varieties of eruptive rock are also present in different places. The eruptive rocks when found in the schist series are usually either in dikes which are parallel to the lamination of the schists, or in large and more irregular masses which have no definite form. When in the Cambrian rocks, they are generally sills or sheets which have spread out laterally to great distances along the planes of sedimentation; when found in the Carboniferous, are of more irregular form, sometimes occurring in short, thick sheets, again in dikes, and still more frequently in very irregular masses.

Much discussion has taken place as to the probability of the phonolites which are present in the Black Hills indicating a recurrence of the types of ore deposits found in Cripple Creek. While there are certain cases in which tellurides of gold have been found associated with phonolites in the Black Hills, bearing some resemblance to Cripple Creek ores, the existence of phonolites themselves in this region does not indicate that there is likely to be found a second Cripple Creek. Phonolites occur in many localities in the world, in Europe, Mexico, and elsewhere, and are in most cases not associated with ore bodies. That they may indicate future mineral wealth in the Black Hills is possible, but not in any sense essential.

### ORE DEPOSITS.

If the placer workings, which are distributed widely over the entire hills be excluded, the productive mining region of the Northern Black Hills comprises a limited area of about 100 square miles. It extends from the town of Perry on Elk Creek, where the Clover Leaf mine is situated, northwestward to the town of Carbonate, on the east branch of Spearfish Canyon, while its widest as well as most productive portion lies between Terry Peak on the southwest and Garden City on the northeast.

Within this rather restricted region are closely grouped together as many as nine distinct types of ore deposits. They occur in each case in a particular geological series, and are, with one exception, not found in the rocks belonging to any other formation. Considering them in accordance with the rocks in which they are found, we may distinguish the following five divisions:

- (1) Ore deposits in Algonkian rocks.
- (2) Ore deposits in Cambrian rocks.
- (3) Ore deposits in Carboniferous rocks.
- (4) Ore deposits in eruptive rocks.
- (5) Ore deposits in rocks of recent formation.

In the crystalline schists and metamorphic rocks of the Algonkian age are found the free milling gold ores, some small deposits of tin, and a few trifling prospects of copper which have not yet assumed any great importance. In addition to these there are certain deposits of graphite which have lately attracted some interest.



In the Cambrian rocks there are gold-bearing gravels which lie at the base of the formation, the refractory siliceous ores which have of late years become of great importance, the lead-silver ores of Galena and vicinity, and some deposits of wolframite which have from time to time produced considerable quantities of this mineral.

In the heavy gray limestones of the Carboniferous there have been found in the vicinity of Ragged Top Mountain, high grade siliceous ores, and at the town of Carbonate the same rocks have yielded large amounts of lead-silver ores closely resembling those of Leadville, Colorado. A few deposits also occur in eruptive rocks. In the latest rocks of all, the gravels which fill the beds of modern streams, have been found the placer deposits, and while they are chiefly of historic interest as representing the earlier development of mining in the hills, they have in peast years produced heavily.

#### ORE DEPOSITS IN METAMORPHIC ALGONKIAN SCHISTS.

Since the attention of miners has been transferred from the gold-bearing gravels, which are always the first producers of a mining region, the free milling lodes which occur in the Algonkian schists have assumed greater and greater importance in the production of this region, until now they are the heaviest producer and constitute by far the most prominent factor in the gold production of the region.

There are in general two areas where ores of this character have been discovered. The first is the great Homestake belt; the second, the Clover Leaf or Uncle Sam mine, at some distance to the southeast, and quite widely separated from the first.

As a report will soon appear by Mrs. S. F. Emmons, discussing in detail the geologic structure of the Homestake mine, the writer will give only a brief summary of this important ore zone, gathered in large part from previously published reports and personal observations.

The Homestake belt is a term which has been applied to a series of mines opened on a great gold-bearing zone in the metamorphic schists, which is located in the vicinity of Lead City. It comprises a group of mines which are known severally as the Homestake, Deadwood-Terra, Father De Smet and Caledonia, but as the Homestake Company has exercised an increasingly important influence in the management, the name has become gradually applied to the entire belt. The surface workings or open cuts from which the ore was first extracted in the early days of the history of this belt, indicate in a broad, general way the location and trend of the ore body. The Caledonia ore body is distinct from that operated in the other mines, and lies to the east of it. The Homestake ore body is not a true fissure vein, but is a broad impregnated zone in the schists, which strikes approximately north 34 degrees west, and is slightly at variance with the general direction of the lamination or the schists. There seems to be a rough dip to the east, but the ore is so irregularly related to the rocks in which it occurs that the general inclination cannot be given with any degree of accuracy. The ore body pitches quite noticeably toward the south, so that at the southern-most portion yet opened up, it is much more deeply buried than in a northerly direction. Alternating with the lenses of ore, and also to the eastern side of them, are many dikes of white, fine-grained rhyolite, which have passed upward between the lamination planes of the schists and spread out in broad flat masses in the remnants of flat-lying Cambrian strata which cap the hills to the west, north and east of the ore zone. In places most of the stratified rock in which these porphyry masses have intruded is now eroded, and on the summits of the divides which separate the open cuts, little is left but the thick sheets of rhyolite. As these porphyry bodies were followed downward they became gradually smaller and fewer in number, the eruptive rock having apparently spread out as it came nearer to the surface and formed branching masses of a lenticular form. The first ore which was mined in the early days formed irregular lenticular masses included almost wholly within these dykes of porphyry, but as it was followed downward it seemed to diverge

from the porphyry bodies, and in the deeper levels of the mine is seemingly entirely independent of them. It is, however, an interesting fact that in the lower levels a mass of phonolite of a dark greenish color has been found, quite closely associated with the wider portions of the ore zone. No exact foot-wall or hanging-wall to the ore can be detected, because it is in many cases difficult to distinguish the mineralized material from the barren country rock.

It seems probable that the Homestake lode, owing to its mineralized character, was a harder and more resistant ledge than the surrounding schists of the Algonkian, and that for this reason it constituted a reef in the old Cambrian seas before the sedimentary rocks above were deposited. That it was then mineralized and gold-bearing is proved by the presence of gold in the basal or lowest rocks of the sedimentary series which lie in the isolated patches about the outcrop of the ore body.

The ores of the Homestake belt taken as a whole cannot be said to present any constant features which serve to distinguish them from the characteristic but barren rocks of the Algonkian series. Pyrite is by far the most invariable indication of mineralization, but it is notably absent from much of the ore. Quartz also occurs in a great number of cases. Perhaps the most usual type of ore would be that consisting quite largely of quartz and pyrite. Other minerals are dolomite, calcite and arsenopyrite; these are also of very frequent occurrence, but no decrease in the values of the ore can be noted when they are absent. Again, garnet and tremolite appear in some portions of the ore in such abundance as to constitute a larger part of the gangue minerals, but the ore here found is of no difference in value from that having a wholly different appearance. It would seem that when the ordinary type of schists is mineralized the ore more closely resembles a schist, but when the amphibolite is mineralized it more closely resembles an amphibolite. Thus it will appear that although we find pyrite, quartz, dolomite, calcite, arsenopyrite, tremolite and garnet frequently constituting, either separately or in combination, the gangue of the ore, no one of these minerals can be considered an indication of the presence of gold. In general, however, it may be said that the ores occupy a zone in the Algonkian rocks which present a greater number of secondary minerals, a more constant occurrence of sulphides, quartz, dolomite, calcite and arsenopyrite, and finally a more advanced degree of distortion and irregularity of structure than do the barren areas of the same formation.

From a careful study of the ores and the general structure of the Homestake belt, it appears that, first, there have been several different periods of mineralization, one at least of which has preceded the deposition of the Cambrian rocks. This is distinctly shown by the presence of placer gold in the lowermost gravel beds of the Cambrian series. Second, there have been periods of mineralization, which followed the entire deposition of the sedimentary rocks later than the intrusion of the dikes of bodies of rhyolite. It is probable that this belt has been the seat of many fracturings and dynamic movements from the earliest geologic time until the present, and has constituted a line of weakness along which mineralizing waters were permitted to circulate more freely than elsewhere. Impregnation of the country rocks at successive periods with vein minerals and small amounts of gold has thus given rise to a workable zone of gold-bearing rock.

In the earlier days of the mine the ore was completely free milling and of higher grade than that now mined. It was highly oxidized and contained little or no sulphurets. As the workings penetrated deeper beneath the surface oxidized material gave place gradually to sulphides, and more and more of the values of the ores failed to yield to amalgamation. For a time the concentrates from the mine were sold to smelting companies, but experimentation on their treatment gradually led to the construction of a cyanide plant with a view to treating the more refractory portions of the ore.



It has been assumed by many who have written upon the geology of these ore bodies that the rhyolite porphyries which occur in intimate association with them have enriched the ore, but there is no evidence to support this theory.

The Homestake mine has, since its inception, been an illustration of the manner in which a large body of low grade ore handled on a large scale, could be made to yield great profit, and its successful operation has been due chiefly to the careful nature of the management and the great business ability of those who have handled it.

#### CLOVER LEAF MINE.

The other mine which has been operated on Algonkian ores is known as the Clover Leaf mine (formerly the Uncle Sam) not far from the station of Perry, on the Black Hills & Fort Pierre railroad. Compared with the Homestake belt its production is comparatively small, but it is of singular geologic interest. The ore body is a large saddle-shaped mass of quartz, enclosed in the metamorphic schists, with its apex striking north 64 degrees west and pitching to the southeast at an angle of 40 degrees. The horizontal section of the quartz body as exposed on the 25-foot level has the appearance of the letter U with slightly flaring arms. The northern arm strikes north 40 degrees west, and the southern, south 75 degrees west. This quartz body is thickest at the crest, and the lamination of the enclosing schist is parallel to its surface, curving around it so as to give to the mass the appearance of a folded lens at the crest of a southeastwardly pitching anticlinal fold in the Algonkian schist. Both of the arms of this quartz mass when followed out from the apex become much narrower than the main body. The northwesterly has an average width of 20 feet, the southwesterly, of about 10 to 12 feet. The gold is contained chiefly in the quartz, in which it often appears free and generally associated with small particles of galena. The quartz and the encompassing schist are heavily impregnated with pyrite which at the surface is completely oxidized. The ore is treated in a stamp mill and amalgamates readily.

Besides these gold-bearing lodes, there occur also in rocks of Algonkian age, deposits of tin, notably in the southern portion of the hills and in the region to the west of Spearfish Canyon, known as Nigger Hill. The country rock in which these deposits occur is a coarse muscovite granite, and the cersite or tin oxide is scattered through this rock in irregular patches increasing and decreasing in amount with little or no regularity. In the earlier days of mining in the Black Hills, it attracted, as is well known, considerable interest, but the unfortunate character of the enterprises which were connected with its exploitation have much retarded its development. The cersite occurs also in placers as stream gravels which have been derived from the disintegration of the country rock containing the tin. The cersite in these gravels is but little rounded, and differs in its black color from the usual reddish brown type of stream tin so commonly found in the vicinity of tin-bearing lodes. While it is possible that these deposits may again be worked, it is hardly probable that they will ever constitute the basis of a large mining enterprise.

A few small prospects of copper have been found at different places in the schist areas of the Northern Hills, but they have not yet been of sufficient size or regularity to attract serious attention.

#### MISCELLANEOUS DEPOSITS IN THE ALGONKIAN ROCKS.

At several localities within the productive mining region, ores have been found which may be properly described with the Algonkian lodes. They are partially in eruptive rocks and partially in brecciated material composed of schist and porphyry, while at times they form veins which pass from one rock into the others; at other points they pass from porphyry into Cambrian rocks. While none of these have yet attained any great importance, there are two that



deserve special mention. The first is in Strawberry Gulch, where quite a number of small mines have been intermittently worked. Much of the ore occurs in a decomposed porphyry in the form of thin auriferous limonite filling the small fractures, or of impregnations in the country rock. In general, these pass downward into unoxidized pyrite, while in a few cases sphalerite and galena have been reported. The porphyry mass in which these ores are found is extremely large and so irregularly intruded into the schists that its relation to them cannot be readily made out. Some of the ore obtained from the mines is reported to have been quite rich but it has so far been too irregular in its occurrence to form the basis of extensive mining. The second locality where ore has been found, which is chiefly in porphyry, is the Old Ironsides mine, near the mouth of Squaw Creek. Here, there is exposed in the side of the creek a sheet of mica-diorite-porphyry about 40 feet thick with beds of Cambrian rock both above and below. Through these rocks runs a series of vertical fractures striking about north 85 degrees east, along which silicification has occurred and from which telluride gold has been introduced into the adjacent rock, often to considerable distances from a fracture. Some of the crystals of telluride—presumably sylvanite—are quite large. The deposition has occurred chiefly in the diorite-porphyry, but also to a minor degree in the Cambrian rocks. At the surface, where the rocks are highly oxidized, gold may be seen along the fractures in a free condition. There are other places in which ore has been found in eruptives, either as fillings or fissures, or as impregnations, but they are not of any economic value. The eruptive rocks as a whole have not been the loci of considerable deposits.

#### ORE DEPOSITS IN CAMBRIAN ROCKS.

As a producer of gold the Cambrian is second in importance only to the Algonkian series. In the rocks belonging to this age or those which lie immediately above the metamorphic schists, there are four varieties of ore: First, the gold-bearing conglomerates or gravels, generally known as the cement deposits; second, the refractory siliceous ores; third, the pyritic ores; and fourth, the lead-silver ores.

#### THE GOLD-BEARING CONGLOMERATES.

At the base of the series of Cambrian strata, immediately above the upturned schists there is generally a bed of gravel. It varies in thickness from a few inches to more than 30 feet. Throughout a large number of areas where the Cambrian strata yet remain uneroded, this conglomerate is generally about three or four feet thick and passes upward into a hard, dense quartzite, which has a vertical range of from 15 to 30 feet. The quartzite is almost universally present at the base of the Cambrian series; the gravel is generally quite thin, but attains a notable thickness in a few localities. One of these is in the vicinity of Lead City. Here the gravel is gold-bearing and has produced very heavily in the past. The productive areas of this gold-bearing gravel are closely grouped about the Homestake belt. They are five in number. One, comprising the Durango and Harrison mines, is west of the Homestake lode, near the southern extremity of the present outcrop. The other four east and north of it, include the Hawkeye, Monitor, and Gentle Annie. One of these lies just east of the Caledonia open cut; another on the divide between Bobtail and Deadwood Gulches; the third on that between Bobtail and Deadwood Gulches, and the fourth on the north side of Bobtail Gulch beneath a heavy capping of rhyolite which forms the high ridge beyond. The gold-bearing conglomerate occupies irregular depressions in the old schist surface, and was probably not uniformly distributed along an old shore line. It thins out to nothing along the strike of the Homestake lode and allows the

higher measures of the Cambrian series to lap over onto the mineralized rock of the Algonkian. A general downward inclination of the schist surface toward the northeast may also be observed.

It is not possible to give exact boundaries to the original extent of these gold-bearing gravels on account of the dissected nature of the areas which now remain. The gravel is composed of rounded, water-worn pebbles of quartz schist and a few fragments of softer schist which seem to decrease in abundance as one proceeds further from the Homestake lode,—that is, from the old pre-Cambrian shore line. The gold-bearing portions of the gravel may be at once distinguished from those which are barren by the character of mineral which cements the pebbles. In the gold-bearing portions this is chiefly oxide of iron when weathered, or pyrite when it has not suffered alteration. The non-gold-bearing portions, on the other hand, have also a rather sandy, quartzose matrix, or are in some instances slightly calcareous. The gold in the richest portions of the conglomerate—those first mined—is chiefly placer gold, for it is rounded and worn by attrition and is concentrated near the bed-rock. It was undoubtedly derived from the erosion of gold-bearing lodes in the Algonkian rocks, and mechanically deposited in depressions along the old shore line. Some of it has been dissolved by ferric sulphate which has resulted from the oxidation of the pyrite and has been redeposited from this solution in thin films in the laminae of the underlying schists. This has also produced an enrichment of the lowermost layers of conglomerate. Besides these two types of gold which occur in these gravels, it is also possible that gold was introduced with the pyrite which either cements or once cemented the pebbles. The introduction of pyrite was subsequent to the deposition of the conglomerates, since it penetrates fractures in the quartz pebbles. It is probably a replacement of the original quartzose cementing material. Intrusion of rhyolite cut the conglomerate in many places, and are often quite heavily impregnated with pyrite. The close relation between these gravel deposits and the Homestake lode, together with their absence along its line of outcrop, seems to indicate that the Homestake zone projected above the level of the surrounding rocks and formed in the old Cambrian sea a reef about which these gravels were deposited. The greater portion of their gold was thus, with little question, derived from the disintegration of the old Homestake lode. They are not to be compared exactly with the gold-bearing sands which are found in the Nome district of Alaska, but are somewhat exceptional, not only because they are the only representatives of what may be termed fossil placers, but because they are not uniformly deposited along the shore but were confined to the vicinity of an outcrop of a large gold lode, and the detrital material from that lode was held in irregular depressions in the sub-marine surface in its vicinity.

#### REFRACTORY-SILICEOUS ORES.

Of all the ores occurring in rocks of later age than the Algonkian, the refractory siliceous ores have thus been far the most important factors in the gold production of the Northern Black Hills. They are widely distributed over a large area extending from Yellow Creek on the Southeast to Squaw Creek on the northwest in a broad irregular belt. This belt includes five productive areas which will be later discussed. The country rock in which the ore occurs is a dolomitic limestone of fine-grained crystalline texture and varying like the ore in its degree of oxidation. It is termed "sand rock" by the miners. In its fresh condition it is a dense, gray crystalline rock, showing innumerable small cleavage faces of dolomite and generally interrupted by bands of greenish-black shale of varying width. When oxidized it has a deep red color but presents the same crystalline texture, while with very advanced alteration it passes into a red, earthy material termed "gouge." Chemical analysis of this rock shows it to be a dolomite of nearly normal composition, while the microscope



shows that it is composed of irregular masses of dolomite with some scattered grains of quartz or clearly bounded rhombic crystals of dolomite. When the rock has been mineralized these are altered to silica and often beautifully preserved. The dolomite beds of this character which have so far been most extensively prospected occur at two positions in the Cambrian series. The first is immediately above the basal quartzite from 15 to 25 feet above the schists of the Algonkian, and known as the "lower contact;" the second, from 18 to 30 feet below the scolithus, or so-called "worm-eaten" sandstone that forms the top of the Cambrian series and termed the "upper contact." Many other beds of dolomite occur at intervening levels and some of them have produced a little ore. There has as yet been but little systematic prospecting upon these beds and it is very probable that they may become important ore horizons in future.

The ore is an extremely hard, brittle rock, composed largely of secondary silica and carrying, when unoxidized, pyrite, fluorite, and, at times, barite, wolframite, stibonite and jarosite. It shows many cavities which are lined with druses of quartz crystals or contain clusters composed of cubes of fluorite. Some of the cavities show large crystals of barite. In some localities the siliceous ore is heavily charged with wolframite, so that in many instances it grades from beds of siliceous ore into flat bodies of almost pure wolframite. Occurrences of this kind are found in the Yellow Creek and Lead City areas. When carrying large quantities of wolframite the ore usually contains great quantities of barite. The ore occurs in flat, banded masses in which the banding is continuous with the bedding planes of the adjoining strata. These masses possess a quite regular channel-like form and follow zones of fracture that vary for the separate districts in their general direction but exhibit a very uniform trend within the limits of any single productive area. These channel-like ore bodies are known as shoots and have a width of from a few inches to, in rare instances, 300 feet. The average width is perhaps about 30 feet, although all widths between five and 100 feet are of frequent occurrence. The length is in all cases many times in excess of the breadth, and in the case of the Tornado-Mogul shoot is about three-fourths of a mile. The vertical dimensions vary from a few inches to a maximum of 18 feet. The average thickness is about six feet. The shoots generally follow either single fractures which are parallel to their longer diameter, or broad areas of parallel or intersecting fractures. The beds of rock that lie above the ore are generally shale of a more or less impervious character, but sills of eruptive rock not infrequently play the same role. On the lower contact the floor is sometimes of basal Cambrian quartzite, but in many cases varying thicknesses of dolomite intervene between it and the ore. In such cases the widest portion of the shoot is directly beneath the impervious rock of the roof, for the solutions have spread out and replaced dolomite to the greatest distance along the under-surface of the impervious rock. The shoots have thus a wedge-shaped form in many cases, the broadest portion of the wedge being at the top.

#### THE FRACTURES.

When the ore that forms the body of a shoot has been removed the fractures by which the mineralizers have gained access to the rock replaced may be traced in the overlying, and where they are uncovered, in the underlying beds. These fractures have been rendered prominent by a slight silicification of the adjoining rock which has often caused them to project from the softer shaly material; they are often iron-stained, also. These silicified iron-stained fractures are commonly known as "verticals." They may be observed in greater or less numbers in all of the shoots of the refractory siliceous ore. The fractures are generally slightly warped surfaces along which slight movement has occurred, or they may be composite zones of fracture caused by the intersection of many small irregular



fiissures. The displacement along such planes of movement is generally very small,—not more than two or three inches,—but it sometimes reaches six or seven feet. They are usually without appreciable open space, for the walls have not generally been removed from one another for distances greater than one-sixty-fourth of an inch. Some notable exceptions occur. They are generally vertical or nearly so. They frequently extend into the beds that form the roof of the ore bodies and sometimes terminate in the ore-bearing beds themselves. They have also been traced through the lower quartzite into the Algonkian below, but in entering that formation their traces are lost in the vertical laminae of the schists.

### PRODUCTIVE AREAS.

The productive areas of refractory siliceous ore are five in number and have been severally designated Bald Mountain area, Yellow Creek area, Lead City area, Garden City area, and Squaw Creek area. The last-named area was at the time of survey little more than a prospect, but has since become an important producer. The Bald Mountain area is the most extensive and important. It is a northwest-southeast belt of about one mile in width and four and one-half miles in length, and the width is limited by the annular exposure of Cambrian rocks that surrounds the Algonkian nucleus of the region. The ore-bearing strata dip to the southwest and pass beneath the Silurian and Carboniferous limestone, while they have been eroded from the Algonkian hills to the northeast with one or two exceptions. Hence, on the north the ore bodies are exposed at the surface, but to the south shafts are necessary to reach them. At the southeast end this area is cut off from the Yellow Creek area by Whitewood Creek. At the northern end the Cambrian rocks are present in nearly their full thickness. With relation to the ore bodies, the area may be divided into two portions; the Ruby Basin district, and the Portland district. In the former the shoots are larger on the lower ore-bearing beds; in the latter, larger in the upper.

The Garden City area is situated at the head of Blacktail and Sheeptail Gulches and an east tributary of False Bottom Creek. It is located on the northern, as the Bald Mountain area is on the southern, rim of the Cambrian outcrop. The beds dip to the northeast and the shoots so far mined have been on the lower contact. A rhyolite cap of great thickness and extent covers the country to the north and the Cambrian beds pass beneath it. The average trend of the ore bodies here is about north 55 degrees east, much more nearly east and west than in any of the other areas.

The Lead City area is located on one of the Cambrian outlyers that caps the hills north of Deadwood, and the ore bodies extend over the gold lode of the Homestake mine. A heavy sill of fine-grained rhyolite lies above the Cambrian on the tops of the hills. The ore bodies are exposed at the surface on the westernmost edge of this area, but lie beneath the shales in an easterly direction. The ore from this district was richer than that elsewhere mined and contained great quantities of barite, wolframite, and in several instances, large amounts of free gold. The Hidden Fortune mine is an instance of this kind.

The Yellow Creek area is situated a little more than two miles slightly east of south from the city of Lead. The ore shoots are in a thin capping of Cambrian strata on the divide between Whitewood Creek on the west and Yellow Creek on the east. The shoots lie on the basal quartzite about 15 to 26 feet above the Algonkian. Much wolframite and barite were also found in the ore from this area.

The Squaw Creek area lies near the mouth of Squaw Creek. Workings have been run upon some ore-bearing beds which pass rapidly beneath the Carboniferous limestones that cover the country

to the north. The horizon is just beneath the scolithus or "worm-eaten" sandstone. Ore bodies of considerable size have recently been opened here and the district has become a productive one.

#### VALUE OF THE ORES.

The gold contents of the ores in the Bald Mountain area run from \$3.00 to \$4.00 per ton to, in rare instances, \$100.00. The general average for the ores in this district is about \$17.00, and those containing from \$10 to \$20 are of the most common occurrence. Ore carrying \$35 per ton is considered high grade. Some of the ore mined from the Ben Hur mine yielded upwards of \$60 per ton in gold. As compared with the ores of the lower beds those from the upper contact are slightly lower in grade so that much of the ore is often left in the mines. They have also been reported to carry a higher relative proportion of silver, but although this is true in individual instances, in general silver ores are as frequent in the lower as in the upper beds.

The three smaller areas of siliceous ore, Yellow Creek, Lead City and Garden City, lying over or to the west of the Homestake ore-body or its continuation produce ore of uniformly higher grade than those from the Bald Mountain country. The mineralization is probably later than the igneous activity, for the verticals which supplied the ores often cut all varieties of eruptive rocks.

As igneous rocks cut strata of the Fort Benton Cretaceous and pebbles of the same rock have been found in the basal conglomerates of the Neocene. it would seem then that the mineralization occurred somewhere between Fort Benton and the Neocene and it probably represents the final phase of vulcanism that was concomitant with the elevation of the Black Hills. This occurred while the Cambrian was still deeply buried beneath its covering of later formation.

#### ORIGIN OF THE ORES.

The refractory siliceous ores have been formed by a process which involved the gradual removal of the original rock substances and the simultaneous substitution of the ore minerals. This is commonly known as replacement or metasomatic alteration and has often proceeded with so little disturbance of the original rock material that both stratigraphic character and microscopic structure are preserved in the ore, although the original rock was carbonate and the ore chiefly silica. The mineral which has been altered to form ore seems to have been exclusively dolomite, for where verticals pass through rocks of varying composition it is found that dolomite also has been appreciably affected. The ore minerals substituted are chiefly silica and pyrite with which there are minute amounts of gold and silver. Smaller quantities of fluorite, barite, gypsum and several other accessory minerals are also of frequent occurrence. To the dolomite, whether present as comparatively pure beds or as cementing material of sandy and shaly rocks, the ore minerals have been transported by circulating waters. Such waters have found in the fractures, trunk channels by means of which they have been enabled to penetrate the encompassing and comparatively insoluble rocks and reach the more readily replaced material. The mass of evidence seems to show that these waters have ascended.

#### LEAD-SILVER ORE OF GALENA AND VICINITY.

The ores belonging to the fourth division of Cambrian ore deposits are similar in form and mode of occurrence to the refractory siliceous ores. They occur in the vicinity of the town of Galena.

At one time these ores filled an important place in the mineral production of the Black Hills. About twenty years ago a smelter was in operation and several mines were producing quite heavily, the Richmond or Sitting Bull mine especially having figured quite prominently in the silver production. After a brief period of activity, however, operations were rather abruptly discontinued and the district was idle until the year 1886, when operations were resumed, although



upon a somewhat smaller scale. Work is now being conducted in a rather desultory manner. Mines that produced this character of ore are situated in and about the town of Galena. Most, if not all, of the ore bodies are in strata of Cambrian age. Some of the principal producing mines are the Richmond, Florence, Hester A, Coletta, Merritt No. 2, Cora, Carpenter, Alexander, Romea, and El Refugio.

The ore is of a more basic character than that found in the more westerly ore deposits heretofore described. When unoxidized it consists chiefly of pyrite, which is either massive or disseminated more or less thickly through the body of the country rock. With the pyrite is associated argeniferous galena, and not infrequently small quantities of sphalerite. In many cases the galena occurs in seams in the pyrite, or as druses of minute crystals lining the interior of cavities. In all cases where they had not been oxidized these two materials have been found associated in this manner. The galena is, therefore, of later origin than the pyrite; occasionally the latter carries low values in gold but these are unimportant. The values that render the mines workable are contained in the argentiferous galena. In most cases there is but little silica associated with the ores, but in the Florence and Richmond, very considerable amounts of secondary silica are found in intimate association with the deposits.

#### ORES IN CARBONIFEROUS ROCKS.

In the heavy gray limestones of the Carboniferous are found two distinct varieties of ore:—

- (1) Gold and silver ores of a refractory siliceous type;
- (2) Lead-silver ores.

In general the Carboniferous rocks have not figured largely in the mineral production of the region.

The refractory siliceous ores are in bodies of comparatively small size and are of less importance than those which occur in other formations. Two districts have been important as producers the Ragged Top district, and the Carbonate district.

The Ragged Top district comprises the country which lies to the northwest of the large mountain of phonolite known as Ragged Top. There is here a series of seven nearly equally spaced vertical fissures or veins, which have been termed the Ragged Top Verticals. These are fractures or crevices in the heavy massive limestone which show at the face a maximum depth of about 10 feet. From this they range, as they pass downward, to extremely minute crevices. In the lower portions where the surface alteration has not been extensive, the ore can be observed to pass laterally into the limestone walls without disturbance of the structure of the latter rock. It is a light uniform buff tint, which is so near the color of the surrounding limestone that it is difficult to distinguish it from the unmineralized rock. It differs in its superior hardness and slight yellow color. Much of the ore is composed of angular brecciated fragments of what was once limestone but now is completely altered to silica. Traces of tellurium have been detected in these ores. At some points in the limestone area about Ragged Top Mountain flat blanket-like beds of ore are found. These are either without distinct connection with the verticals or seem to have spread out from them. Some of the ore from these verticals was quite rich, and in general it carried higher values than the siliceous ores found in the Cambrian rocks.

These Carboniferous siliceous ores have not at any time been very heavy producers but have yielded small amounts of ore for some years. The cyanide process has been used in their treatment with much success.

#### LEAD-SILVER ORES.

Lead-silver ores were in the earlier days of mining in the Black Hills a very important factor in the production of precious metals. They were found in the vicinity of the town of Carbonate. In 1886 this



was a flourishing camp and produced considerable silver and lead. The product was almost exclusively that of the Iron Hill mine, but other mines in the neighborhood added a little to the total.

The country rock that carries the ore is the gray Carboniferous limestone in which sills, dikes and irregular masses of porphyry have been intruded. The ore bodies are of two kinds,—large irregular bodies of lead carbonate, which pass in places into more or less feet on the east side of a thick dike of fine-grained white porphyry masses; and partially filled crevices which resemble in a general way the verticals of Ragged Top.

The first type of deposit is that which has formed the chief source of silver in the district, and this, as shown above, was largely obtained from the Iron Hill mine. In this mine the ore was a large mass of argentiferous lead carbonate which extended down for 300 feet on the east side of a thick dike of fine-grained white porphyry. Much galena, also, was found, together with the carbonates, and after the ore was worked out a seam or vertical was detected extending downward from the main mass. Other pockets of ore were also found at different points, and in one place a pocket of vanadinite containing some four or five tons was encountered. Mr. Fowler reports the occurrence of the following minerals: galena, cerrusite, cerargyrite, matlockite, wulfenite, pyromorphite, platternerite, atacamite, and vanadinite. This type of ore resembles in its general character and in its association with porphyry bodies the deposits described by Mrs. S. F. Emmons, of Leadville, Colorado. Too little is known, however, regarding the details of the ore occurrence to afford any more definite idea of the manner in which it originated than the simple fact that it is probably a replacement of the limestone.

Of the second type of occurrence the most important case is that at the Seabury mine. This consisted of an irregular crevice striking south 85 degrees west and running through the Seabury, Iron Hill, Segregated Iron Hill and Adelpia mines with a possible continuation in the Spanish R, a mine in which some ore was obtained, but at too great distance for its relation to the others to be clearly made out. The crevice varies from one to twenty feet in width. The sides consist of a ferruginous jasperoid material which replaces the limestone, often for two or three feet from the crevice, and contains at times galena, lead carbonates and horn silver in sufficient amount to be profitably worked. The latter mineral most frequently occurs as a thin film covering druses of fine quartz crystals which form linings to cavities.

The center of the crevice was loosely filled by a soft, ferruginous, gouge-like matter of a pinkish red color and containing gold. A large quantity of this ore is reported to have been mined from the Seabury, and also from the west side of the porphyry dike in the Iron Hill.

Since 1891 there seems to have been but little work done in this district, no output being recorded for that period. Within the last year, however, a small 35-ton cyanide plant has been erected to treat the tailings from the old smelter.

In concluding this brief review of the ore deposits of the Northern Black Hills,—a subject which it is difficult to treat satisfactorily in the space allowed, one seems warranted in dwelling a little on the future prospects of the region.

Mining communities are, from the limited nature of the deposits upon which their activity is based, generally short-lived. That this is true, one needs only to glance at the history of many western mining camps. A few, it is true, have, like Leadville, been productive for many years, and will probably continue to be so in the future, but there are few, if any, which, if based wholly upon mineral production, will not in time cease to thrive as their economic resources become exhausted.

If the production of the region be prolonged sufficiently for the community's activities to be directed along other lines, what was

once a mining camp may become a permanent settlement. In the Black Hills there are perhaps two features which may operate to give to the region a greater permanency than that which is generally seen in communities which are held together by mining interests. The first is the unusual size and the presumably long life of the mines of the Homestake belt. The second is the gradual decrease in the cost of treatment of other grades of ore and the consequent opening of the market to material previously known but hitherto unworkable. The introduction of the cyanide process and the quantities of ore which may be treated by its use have done much to extend the life of the Black Hills mining. It is not improbable that these two factors working to gether may so prolong the mineral production of the region that the population may never be less than it is. The other interests which grow side by side with the mining industry may then have become so important and so little dependent on the mineral wealth of the country that their existence alone will be sufficient to support the cities which have grown up in this mining country.

J. D. IRVING,

U. S. Geological Survey.

PRESIDENT RICHARDS: We will now listen to an address by Dr. J. E. Todd, state geologist of South Dakota; subject, "Sketch of South Dakota."

DR. J. E. TODD: Mr. President, Ladies and Gentlemen: With your permission I shall endeavor to abridge the paper that I had planned and instead of reading what I had prepared.

(Dr. Todd maps and stereopticon views to illustrate his lecture.)

#### SKETCH OF SOUTH DAKOTA GEOLOGY.

Introductory.—The task asked of me is to give, so far as is practicable in the time allowed, a sketch of the geology of our state, particularly of that portion outside of the Black Hills. The Hills being more complicated and not perfectly explored, I cheerfully leave to others who have more time to devote to its elaboration and presentation. Moreover, as you can readily understand, we have only time to select some of the more salient features of the vast amount of details necessarily connected with such a theme.

It will be my aim to present in order the various geological formations, giving their leading characteristics, their extent, and note their more important economic relations. As few of them have to do with mining enterprises directly, I shall assume some freedom to go beyond the strict aim of the Congress and shall venture to bring in a few facts directly connected with mining.

After a discussion of the geological map I will present illustrations of different formations by the help of the stereopticon.

#### GENERAL STRUCTURE OF THE STATE.

For the benefit of those unfamiliar with our state I make a few general statements which may seem trite to those already well acquainted with it.

South Dakota presents greater range of altitude and greater variety of topography than any other state east of the Rocky Mountains. Its lowest point, Big Stone Lake, is 967 feet above the sea and Harney Peak, its highest, 7,215 feet. It has extensive plains rivaling a floor in smoothness, rugged mountains surpassing anything in the Appalachians, buttes rising like giant pyramids above the plains, and weird bad lands, the veritable work of goblins.

South Dakota has also a greater variety of geological formations than any other state east of the Rocky Mountains, presenting a nearly complete series from the oldest to the youngest rocks.

I have two centers of ancient crystalline rocks at opposite ends of the state. Around one nearly all of the Paleozoic formations circle, and against the other most of the Mesozoic rest, while the Tertiary



rocks lie between and the Quaternary deposits are developed in wonderful profusion both of aqueous and glacial origin.

Late estimates of the thickness of sedimentary or stratified rocks in the state reach a maximum of 10,500 feet, of which 1,300 are Paleozoic, 8,000 Mesozoic, and 1,200 Cenozoic. If we make the bottom of the Cretaceous strata or the crest of the "hog-back" surrounding the Black Hills, the dividing line, there will be about 8,000 feet of sedimentary rock outside of that limit and about 2,000 inside. In this, of course, it will be understood, we neither include the schists, granites or porphyries of the Black Hills nor the granites and quartzite of the eastern end of the state, which together are commonly estimated to have a thickness two or three times as great.

The stratified rocks outside of the Hills consist mostly of soft shales, clays and sands, though extensive deposits of sandstone and limestone appear in some localities. The general softness of the strata is attested by two inch holes being drilled 2,000 feet in depth and a hole over 1,000 feet drilled and well finished in four days.

We have said that the stratified rocks were arranged around two centers of crystalline rocks, viz., the Black Hills, which may be compared to the horn of a saddle and the other Sioux Falls granite area, which runs westward from the wider granite area of Minnesota, which may be conceived to form the back and ridge of the saddle. This ridge, which may be looked upon as a buried mountain range, disappears under the later strata near Mitchell, but is traceable in wells to the vicinity of Chamberlain and will doubtless eventually be found existing nearly to the Black Hills.

Upon this saddle-like sub-stratum of granite rocks the Cambrian, Silurian, Carboniferous, Jura-Trias, and Cretaceous rocks have been laid like blankets, declining to the north and the south. Those preceding the Cretaceous have been formed around the "horn," but have not reached more than half way to the east end of the state. They are exposed only around the Hills, and, as before stated, are to be described by another.

#### GEOLOGICAL FORMATIONS AND THEIR PRODUCTS.

Crystalline or Algonkian.—Before taking up the sedimentary rocks we spend a few words upon the granites of the eastern part of the state.

Near Big Stone Lake, in Minnesota, extensive quarries of granite are worked. The stone has been pronounced equal and even superior to New England granite for ornamental and building purposes. The granite extends across the line at Big Stone City and there is an outcrop five to eight miles southwest of that place. The rock rises several feet above the general surface and there is no reason why it should not be quarried, except its greater distance from a railroad. A plant is already in operation at Aberdeen for working and polishing the Minnesota rock.

The Sioux Falls granite or quartzite, named after its prominent occurrence at that point, is a younger, but, if possible, a more durable rock. The outcrops of this rock are scattered over a rudely triangular area extending to the northwest corner of Iowa, to the altitude of Dell Rapids on the east line of the state, and westward to a point a few miles southwest of Mitchell. In this area there are probably three or four miles of naturally exposed surface, mostly in the valleys or streams. Such exposures have been quite generally worked for local use, but nowhere for exportation except at Sioux Falls, at East Sioux Falls, where one of the largest quarries is located, at Jasper, Dell Rapids, and Spencer. The rock is very hard, strong and of a light, cheerful color, sometimes of a mottled gray, but usually of different shades of pink and light purple. It is commonly fine-grained, breaks quite evenly, not only with the plane of stratification, but also in other directions. It is susceptible of fine polish and is much sought for ornamental and building purposes.



Recent reports announce that an extensive outcrop of another crystalline rock has been found near Sioux Falls. It is a very handsome diorite of medium grain, black and white. It is susceptible of fine and durable polish and promises to become a valuable stone.

**Cretaceous Rocks.**—These cover nearly the whole state. Some would say that at one time they covered the Black Hills completely, and all agree that they at one time covered the whole of the eastern end of the state. At present they cover about nine-tenths of the state, though they are in turn more than half covered with the Tertiary and Quaternary formations. In their thickest development they may attain 5,000 feet or more, near the Black Hills. Beginning with the oldest or lowest formation, the Cretaceous includes (1) the Dakota, (2) Colorado, (3) Montana, and (4) Laramie.

**Dakota Cretaceous.**—This group is named not from our state, but from Dakota City, where it was first studied, which was then a pioneer town of Missouri Territory. The Dakota includes, beginning at the bottom, (1) 200 to 350 feet of bluff and gray sandstone, prominent at the west end of the state (Lakota),

(2) a gray limestone, 30 feet thick, locally developed near Hot Springs (Minnewasta),

(3) a formation consisting mostly of shales of various colors, 30 to 100 feet, (Fuson),

(4) a massive bluff sandstone which usually forms the crest of the "hog-back" around the Hills, 35 to 100 feet thick, (Dakota proper).

Of the valuable quarries and deposits of fire clay in this formation I leave for others to speak. It is more in order for me to dwell on a natural product furnished by this formation, which easily outranks in utility if not in nominal money value, any other natural resource of the state. Though its development is not called mining it employs much machinery, involves much engineering, and employs some hundreds of men most of the time. Unlike most mining the product does not have to be brought laboriously to the surface but comes without effort when once set free. No, it is not petroleum or gas, but a much more beneficial element,—water.

Notice the position and relations of this Dakota formation. It underlies four-fifths of the state and has similar relations to the great plains generally from Canada to Texas. It is overlaid by thick, impervious clays of succeeding formations. Its western edge lies from 3,500 to 6,000 feet high on the eastern flank of the crest of the continent and around all the mountains lying east of that range, like the Black Hills. There the water enters from the rainfall directly, from the seepage of streams which traverse its edge, and from the other porous formations which communicate with it below the surface either by faults or contact planes. The eastern edge, which lies only 1,000 to 1,200 feet above the sea, is comparatively closely sealed up by the deep covering of Cretaceous clays and glacial clays, although there are notable springs which show themselves at several points along the James and Missouri rivers, which are doubtless outlets from this deposit. Moreover, the erosion of the glacial period and of more recent streams have so lowered the surface that one-fourth to one-third of our state may obtain flowing wells from this source and still other portions may obtain inexhaustible pump wells with the water near the surface.

It also no doubt has large quantities of water stored within it, much of it possible at altitudes so high that it might keep up the supply for some time even if rain and river should cease.

More than 2,000 wells are now flowing in the state and are being increased by about 300 a year. They may be very roughly estimated to furnish over 70,000 gallons a minute, which would probably be about ten times the springtime size of the Cheyenne River at Edgemont. Most of these wells are small, many an inch and a quarter in diameter, and it is now generally recognized that such wells are not only cheaper but more convenient, more serviceable and longer-lived than the large wells, such as were made several years ago. Most of

the large wells have shown a steady decline, due probably to the fact that they deliver the water more rapidly than it can gather to them from the water-bearing rocks. In some places they have fallen off in flows and pressure one-quarter to one-third. In some narrow areas wells have ceased to flow, apparently from local exhaustion of water. But on the other hand wells have been flowing nearly twenty years and still have pressures of 60 to 80 pounds to the square inch. Wells have been used for nearly that length of time for power, running electric lights, flouring mills, etc., and are still in use.

In several of the wells natural gas forms an important ingredient. This is true particularly along the Missouri River from Lyman County to the north line of the state. The city of Pierre, from one or two wells is abundantly supplied for lighting, and for power for city purposes, and to a considerable degree for heating. Three wells in Sullivan County, one in Walworth and one in Campbell, in fact all which have been opened along this line, furnish gas in similar quantities. It seems not unlikely that these wells lie in the eastern border of a gas region extending possibly as far west as Meade County. The gas seems to be derived mainly from the same strata which furnish the water. It may possibly enter the Dakota formation from the Carboniferous underneath, and may be originally derived from extensive beds of carbonaceous matter deposited in the eastern margin of the sea of Carboniferous times.

Lignite is found frequently in drilling wells in thin strata, but so flooded with water that no attempt has been made to obtain the product. Thin layers, 12 to 36 inches in thickness, have been found locally developed near Ponco, Nebraska, and Sioux City, and also around the Black Hills. Petrified wood, though not of a quality suitable for ornamental purposes, is found in considerable quantities around the Black Hills.

Colorado Cretaceous.—This is named from its prominence in Eastern Colorado and includes a series of shales with local development of sandstone and limestone, estimated by Mr. Darton to be from 1,450 to 1,700 feet thick around the Black Hills, and it is from 200 to 400 feet thick in the eastern end of the state. This series is commonly spoken of as the Benton from its great development near Fort Benton on the Upper Missouri. The Colorado also includes about 200 feet of chalk and calcareous shale, which Dr. Hayden called the Niobrara. It is conspicuous along the Missouri River from St. Helena, Nebraska, to the great bend above Chamberlain, because of its whiteness when washed. It is, however, often overlooked when unweathered because of its grayish tint resembling the shales above and below it. The Colorado formation contains two or three minor horizons carrying water and supplying artesian wells in the eastern part of the state, but they need not be especially distinguished from those of the Dakota.

The chalk has a very small economic value as a building stone, for which it may be profitably used if carefully selected.

Its much more important use is for the manufacture of Portland cement. Its fine grain, porous structure, homogeneous character and easy grinding make it admirably adapted for mixing with clay for making a superior grade of cement. This is being extensively used for buildings and sidewalks throughout the state. Its chief factory is at Yankton, but scores of such plants might be advantageously placed along the Missouri River and around the Black Hills if there were sufficient demand.

Montana Cretaceous.—This is composed mainly of the Pierre shales named from Fort Pierre, which are dark-colored and often becoming plastic clay when wet. They are about 1,200 feet thick near the Black Hills, 300 to 400 in the eastern part of the state. They constitute the most extensive stratum of the Cretaceous, covering at least nine-tenths of the state. This is the "gumbo" of the trans Missouri region and constitutes probably nine-tenths of the substances of the glacial clays east of the Missouri. Hence it is a dominant element



in the formation of soils over much of the state. It is rich in mineral salts favorable for grains and grasses. The prairie grasses growing upon it are noted for their nutritive and fattening qualities. Moreover, its impermeable character holds the limited rainfall near the surface and promotes rapid growth in the rainy season. Afterwards it dries quickly and completely and preserves the grass as a natural hay, nutritious as grain.

Its plastic character when wet promotes its rapid erosion and the frequent occurrence of land slides which have an important effect on the topography wherever it is found. It carries little or no water, and if present of poor quality.

The Montana also includes the Fox Hills formation, 150 to 300 feet of shales and sandstone overlying the Pierre. It may possibly be a local development in the later Pierre. It caps the eastern part of the dividing plateau between the Cheyenne and Moreau Rivers and also between the latter and the Grand. Its sandy character forms a natural mulching for the regions where it extends. Growth of grasses and crops extends over a longer period, and they are not subject to such extreme drouths as upon the "gumbo." Springs are not infrequent. Because of its attractive fossils it is often a rich field for the collector.

Laramie Cretaceous.—This, in our state, is represented by perhaps 2,500 feet of sandstone, shales, loams and clays, interstratified. It is a fresh-water formation unlike all preceding, which were marine. It was formed by streams, marshes and lakes. It is probably thickest in the northwest corner of the state, thins rapidly to the south and more slowly to the east. Its ragged edge extends nearly to the Black Hills on the south and across the Missouri River along the northern line of the state, where it appears in conspicuous buttes.

For soil making it combines the qualities of preceding formations. It frequently exhibits fine springs. It contains, especially in its upper portions, thick deposits of sandstone which in time will be very valuable for local buildings.

Undoubtedly the most valuable product of the Laramie is lignite. It has already attained prominence as a commercial product in North Dakota. There it is found in thicker beds and nearer lines of transportation, but beds 5 to 15 feet thick are not uncommon in the vicinity of Short Pine Hills, Cave Hills, and Slim Buttes, and workable beds may be found north of a line extending from near the south end of Slim Buttes to the head of Fire Steel Creek, in northwestern Dewey County, and thence northeast to where Oak Creek crosses the north line of the state. This includes an area within our borders of about 5000 square miles.

Lignite differs from coal in containing a large amount of water, which, by evaporating, causes it to slack. This interferes with its convenient use as a fuel. In Germany it is extensively formed into briquettes or small blocks which form a superior domestic fuel.

We look upon the Pierre and Laramie as the most hopeful source of petroleum, if such be found in our borders. We are led to this by the deposits in the neighboring state of Wyoming and by the fact that little or no trace of oil has been found in the drilling of the numerous wells in the eastern portion of our state, several of which have gone down to crystalline rock. It must not be assumed, however, that we have sufficient evidence to arrive at any conclusion in this matter.

The Cretaceous was a time when reptiles ruled the world. Gigantic and strange forms swarmed upon the sea and land, and some were even given wings to navigate the air. During Colorado and Montana times the forms of life were largely marine. In the Laramie huge land forms became numerous. In our views we exhibit some of them.

#### TERTIARY FORMATIONS.

These include light colored marls, sandstones, and clays which are so conspicuous in the White River Bad Lands. They are divided into the so-called White River beds, 800 to 900 feet thick in the higher



points around Pine Ridge and thinning out in all directions more slowly to the east. There is also a patch in the vicinity of Short Pine Hills and Slim Buttes. Over these lie generally, and thicker toward the east, 300 to 400 feet of loams and marls with mortar-like sandstones. These extend east of the Missouri River in the southern portion of the state in the more elevated points, like Bijou Hills and Wessington Hills.

The peculiar erosion of these beds cause the noted White River Bad Lands, of which we show characteristic views. The deposits are all of fresh water origin, the work of rivers and lakes by which the weathering of the mountains on the west were spread out in extensive sheets upon the plains on the east.

In the Tertiary times reptiles had passed and mammals began to have their day. Nature at that time made some strange types which seem to have proved unfitting to continue, but others have by transformation lived on to the present and are now the esteemed and useful servants of man—the horse here deserves most prominent mention.

Of economic effects of these formations, we may briefly mention natural shelters for stock, frequent springs, and contributions to curiosity shops in the way of fossils, some ornamental stones are found in considerable quantities—satin spar, moss agate, and blue chalcedony or sapphire. Fuller's earth and volcanic ash abound, and will in time be counted valuable.

#### QUATERNARY FORMATIONS.

These comprise the unconsolidated deposits which lie upon the surface of other formations like a blanket and which are frequently spoken of as drift. The eastern half of the state, east of the Missouri River, is almost completely covered with a blanket of till or boulder clay, 10 to 200 feet in thickness, lying upon highlands and lowlands alike. Associated with it are belts of stony hills or moraines, lake beds and ancient channels are frequent features. Here are included also the numerous terraces, some of them 300 or 400 feet above the present stream, and sometimes several miles in width, covered with sand and loam which come in to modify the effects of the formations hitherto discussed. These terraces are particularly prominent along the western tributaries of the Missouri, but are also conspicuous on that stream and along channels now vacated, but occupied during the glacial period.

The marked effects of the Glacial Period upon the geography of our state we need not dwell upon, but turn our attention more to the economic results which many may overlook.

We sometimes become impressed by the great expense necessary to prepare the natural surface for the proper location of manufacturing plants, irrigation projects, or the building of cities. The work of the glacial period, especially in the eastern half of the state, can scarcely be over-estimated from an economic standpoint. By it the surface was smoothed and beautifully graded for agricultural purposes, natural basins were formed for the retention of rainfall, thus giving an object lesson to man for the further improvement of the region, extensive deposits of sand and gravel were formed, the components of various formations were intermingled and ground together to form a rich sub-soil, picturesque lakes and pleasing elevations were formed for pleasure resorts, and extensive terraces conveniently located along prominent streams seem naturally prepared for suitable locations of cities and towns.

It scarcely need be stated that no traces of precious metals have been found outside of the Hills. While in California and other localities gold has been found in Mesozoic and Tertiary strata, it should be remembered that it has always been in connection with marked disturbance of the earth's crust with the formation of veins and the outflow of igneous rocks. No such disturbance has yet been noted in our borders. Strata have been somewhat tilted in the Slim Buttes and profound crevices have been formed in the Tertiary of the Bad Lands

and filled with sand, gypsum and quartz, but these have evidently failed to reach to the deep-seated waters which are the usual vehicles of precious metals.

The finding of gold has been reported from several localities, but it has invariably been found to rest upon very superficial or mistaken evidence. At a few points in the eastern part of the state very minute quantities have been found in the glacial drift, which may be reasonably referred to the region of the Lake of the Woods as their probable origin. The most clear case of this sort was at Gary several years ago.

This is the story of the rocks of our state outside the Hills, so far as has yet been interpreted. It is full of promise. Nature has done her part, probably better than has been sometimes thought. Wherein our circumstances are novel or peculiar a hint is given us of the peculiar testimony to which a kind Providence has called us. The secret of commercial and social success in our commonwealth is to learn the truth concerning our resources and the best methods of utilizing them. Let us go on in an honest, generous spirit to make the most of them patiently and hopefully, and to welcome and encourage all who may cast in their lot with us.

J. E. TODD,

State University, Vermillion, South Dakota.

State Geologist.

Upon motion duly seconded Congress adjourned to meet at Lead, South Dakota, September 9, 1903, at 9:30 A. M.

Lead, South Dakota, September 9, 1903, 9:30 A. M.

PRESIDENT RICHARDS: Congress will be in session. Owing to the fact that there was a misunderstanding as to the time and place of meeting it has been decided by the Committee on Program that we will transact whatever business you have to transact this morning and simply adjourn the program until 1:30 this afternoon. What is your pleasure, gentlemen, this morning?

MR. RUSSELL, OF SOUTH DAKOTA: The Transportation Committee desire to announce to the Congress that from the 10th to the 15th of the month both railroads, the Northwestern and Burlington, have put on a one fare rate to all points in the Black Hills north of Custer and north of Hermosa, and one fare for the round trip in and out from Lead to Deadwood, so the visitors at the Congress who are able to remain over after the Congress will have the advantage of a one fare rate for the round trip in and out from Deadwood to any point practically in the mining section of the Hills.

MR. ELDER, OF SOUTH DAKOTA: I desire to announce that the program arranged for this morning will be continued until this afternoon.

Attention of Congress was called to the mineral exhibit at Lead, and all were cordially invited to visit the same.

PRESIDENT RICHARDS: I am requested to announce that there will be a meeting of the resolution committee at eleven o'clock at the Golden Star club rooms: all having resolutions can present them there.

MR. BROWN, OF COLORADO: From reading the by-laws I would infer that all resolutions are to be read by the secretary and then referred to the Resolution Committee.

PRESIDENT RICHARDS: They are read in session and then referred to the Committee.

MR. BROWN, OF COLORADO: I would suggest that persons having resolutions will present them now and allow the Secretary to read them.

MR. BROWN, OF COLORADO: I desire to have this resolution relating to requesting the statisticians at Washington to credit to the



mining industry all products which are directly the result of mining, read by the Secretary.

Secretary Mahon read the resolution.

PRESIDENT RICHARDS: The resolution will be referred to the Committee on Resolutions.

MR. RUSSELL, OF SOUTH DAKOTA: Mr. President, I would move you that the proposed constitution and by-laws, as adopted by the Executive Committee be read at least and presented to the Congress at this time.

PRESIDENT RICHARDS: If there is no objection the Secretary will read the by-laws that are to be submitted for your consideration.

MR. GEORGE, OF DEADWOOD: Mr. President, in considering these by-laws are they to be considered as a whole or considered seriatim?

PRESIDENT RICHARDS: It is entirely at the disposition of the Congress.

MR. GEORGE, OF DEADWOOD: What is the motion now?

PRESIDENT RICHARDS: Simply that the Secretary read the by-laws.

MR. GEORGE, OF DEADWOOD: I reserve the right to move they be taken up seriatim and considered by sections.

PRESIDENT RICHARDS: As soon as they are read they will be taken up for disposition.

MR. LYNCH, OF MONTANA: Do I understand we are to adopt these by-laws as an entirety or adopt them section by section.

PRESIDENT RICHARDS: At this time they are simply presented to the Congress for disposition simply to call your attention to it as a whole, then it is before you for consideration and disposition.

PRESIDENT RICHARDS: If you will permit of a suggestion, in accordance with the instructions of the last session, the Executive Committee executed and filed in the office of the Secretary of State of Colorado articles of incorporation under the laws of Colorado. These by-laws which you are now about to act upon became the by-laws of that corporation. The question may arise in your mind under the laws of Colorado as to who would be entitled to vote on the question of adopting these by-laws. You might consider that question with the others as it is purely a legal one and you will probably want a report of the Committee on Credentials before any vote is taken, so I submit that suggestion for your consideration.

Secretary Mahon read the proposed by-laws.

MR. ELDER, OF SOUTH DAKOTA: I move you that the matter of acting upon these by-laws be left over until Friday morning. There have been a great many of them published and distributed and this is the first opportunity that any one has had to hear or read them, and it seems to me we ought to have at least a day or two to consider before we act upon them. That would give us the time.

The motion was seconded.

MR. GEORGE, OF DEADWOOD: I have an amendment to the motion, that it be made a special order for 9:30 Friday forenoon and that each section be considered by itself and adopted by itself and then when through that we adopt them as a whole.

MR. BUCKLEY, OF MISSOURI: I will second the motion.



PRESIDENT RICHARDS: It has been moved and seconded that the motion just made be amended by making the consideration of the by-laws a special order Friday morning at 9:30 o'clock, with the proviso that we shall consider these by-laws section by section and when these sections are adopted that the by-laws then be adopted as a whole.

The motion was carried.

PRESIDENT RICHARDS: Are you ready for the motion as amended?

The motion as amended was stated by the President and carried.

MR. PATTERSON, OF NEBRASKA: As Chairman of the Committee on Credentials, I would like to report this morning that we have not received all of the credentials of those who seem to be present and we do not like to report until we have them all in. If there are members who have been appointed by their governors or mayors, or Chambers of Commerce in their respective localities notify the Chairman of the Credentials Committee and he will be pleased to record the name and address. The Credentials Committee would like to report as soon as possible to this convention the number of delegates here at present.

MR. ABBOTT, OF COLORADO: Are not these credentials on file with the Secretary?

MR. PATTERSON, OF NEBRASKA: There are some, but I am informed there are a great many not in the hands of the secretary.

MR. LONG, OF WASHINGTON: I am seeking for information for myself. I intend to announce to the honorable members of the Congress that I am here as a member of the Congress and have with me a copy of a monetary measure I hope to have introduced at the next session of Congress, being a solution of the monetary interests of our government, and it would be a pleasure to me if I might have the privilege of stating the provisions of it, and I have here a resolution which I should like to present to this Congress for its approval.

MR. GEORGE, OF DEADWOOD: Mr. President, I notice we have a good many delegates here, and I believe it is an oversight that we have not a page or messenger here so that when a gentleman has a resolution it may be taken to the secretary, so therefore I will make a motion that a messenger or page be appointed to act on the floor for the convention.

PRESIDENT RICHARDS: I am authorized to state that the mayor will provide a page for the rest of the session.

MR. GARLEY, OF WASHINGTON: Mr. President, I move that the resolution of Mr. Long, if it be in order, be referred to the Committee on Resolutions.

PRESIDENT RICHARDS: It will be so referred.

MR. GEORGE, OF SOUTH DAKOTA: I move we adjourn.

MR. PATTERSON, OF NEBRASKA: It seems to me inasmuch as we have an hour to spare before 12 o'clock and there are so many present that we should not adjourn.

MR. GEORGE, OF SOUTH DAKOTA: I withdraw the motion to adjourn.

MR. PATTERSON, OF NEBRASKA: We have come here a long distance to attend this Congress, and here we would waste an hour, from 11 to 12 o'clock, when there are so many present, in not using the time for discussion along the lines of mining. I have not anything

particular to suggest, but I presume there are others who have, and we would like to hear from them, those who are delegates. I merely make the suggestion. Tomorrow we will not be in session. We are invited to visit the Homestake mine tomorrow and there will be no session. The next day is Friday and there will be a great many, probably, thinking about going home. There are also many thinking of taking little short trips through the Hills to see the Black Hills while they are here, which is well worthy of a trip. I have been all over them and I want to say to those who can make the trip, that you cannot make any trip in any direction here but what will be edifying, instructive and entertaining and I would like to see every one, who has the inclination and the time to take a trip, for instance, to Spearfish, and to other points of interest, mining interests, in this section. For that reason, as well as other reasons, I think we had best devote this hour until the noon time, in discussion, general miscellaneous discussion in the interests of our Congress.

PRESIDENT RICHARDS: The suggestion is certainly a good one, and we would be glad to hear from any one at this time.

MR. ELDER, OF SOUTH DAKOTA: It was announced just a moment ago that the program that was arranged for this forenoon would be continued until this afternoon. I do not know whether many have left the hall who desired to hear a paper or not, but if they have not I would say we have the paper set down for this forenoon by Mr. John Blatchford, of Terry, South Dakota, read at this time. I know we could not put the forenoon in in any way that would be more profitable than by listening to his paper, and it will occupy about 30 minutes, as I understand it, and fill in the balance of the session and also give opportunity for discussion and question on this subject. He has consented to read this paper this morning if the Congress so desires. (Applause.)

PRESIDENT RICHARDS: If there is no objection then we will be pleased to hear from Mr. John Blatchford, of Terry, S. D., at this time. (Applause.)

Mr. John Blatchford, of Terry, South Dakota, read the following paper:

#### THE POTTS DAM OR FLAT FORMATION OF THE BALD MOUNTAIN DISTRICT.

In describing a portion of this formation I shall only touch on the geological part of it because that has been gone into so extensively by such men as Newton, Devereaux, Headden, Blake, Jenney, Carpenter, Hoffman, Farrish, Dr. McGillicuddy, Rickard, Smith, Fulton, O'Hara, and a number of other noted men who have written some very good papers showing the geological features of this part of the country. I merely intend to say a few words on the occurrences of the ore bodies as we find them in this formation.

These ores were first discovered in 1877, but there was very little done on them until 1890 and 1891, because, up to this time, all of the ore had to be hauled by teams and shipped out of the country to be treated. In the latter part of the summer of 1891 the Burlington and the Elkhorn Railroad Companies placed a number of spurs into the different mines, after this the work really began in earnest.

At this time it was not known how extensive these ore bodies would prove to be, but after continuous work for over twelve years, now, we find that they are almost unlimited. Ores that we could not look at years ago, on account of their low grade, can be handled today, with our new reducing or cyanide process, at a profit.

Since it has been discovered what these ores can be treated for with this process, we find that we have to work over the whole section, which we have been working on since we began. There is no doubt



but that this will be a great advantage to us, in the future, because we will be able to take out our low grade ore, as well as the better grade, as we advance in our work.

The ore bodies or chutes are numerous. The largest bodies so far discovered, of the better grade ore, east of Bald Mountain and Terry's Peak, lie on the quartzites, and these lie on the Archean schists and slates; this is what is known as the vertical formation. Some places in our mines, the flat ore body is known to lie and to be intermixed with a vertical ore body, which comes from below, not showing any division by quartzites. It is one of the occurrences which causes me to believe that there are a number of these vertical ore bodies or quartz ledges, that are covered up by this sedimentary formation, for instance, quite a portion of the Homestake ore bodies have been more or less covered by this flat formation, but in other places the flat portion being more or less eroded, left the vertical portion to be more easily prospected than it is in this district.

The eastern boundary of the flat formation begins at the original Golden Reward and Buxton and almost at the base of Bald Mountain on the north, and to the west of Sugar Loaf Mountain on the south. It starts with a thin layer of quartzite, lying on the schist, covered with sandstone and shales; it gradually thickens toward the west, not so much because the hill rises but because the quartzite and schist drop. It drops at various distances at a time until it gets several hundred feet below the surface; making a number of layers of different material above it, and on and between some of these layers is where we find what is called top contacts.

As we get nearer Terry's Peak the flat formation thickens more by the rise of the surface than by the fall of the quartzite and west of the Peak it seems to keep this thickness for a number of miles. Towards this rise or thickening of the formation is where the top layers of ore become more numerous. How many layers or so called contracts there are has not yet been determined. There is something new continually cropping out.

In these upper layers we usually find a vertical or crack filled with ore extending downward for hundreds of feet, with a number of lense like shaped bodies of ore, branching out at different intervals, some places connecting with bodies from nearby verticals.

At present most of the workings west of the Peak are on the upper contacts. In the Ragged Top district the ore bodies are up in the lime and they are proving to be very extensive and profitable. Around Portland they are all in the shales, scarcely any work in that neighborhood being done on the quartzite as yet. There is no doubt in my mind when they commence to look for the lower ore bodies west of the Peak but that they will find them large and valuable on the quartzite just the same as they occur east of the Peak.

The gulches on the surface on the east side of the mountain all trend toward the east and on the west side of the mountain toward the west, but underground we find this different; from Bald Mountain south it appears that the original channels all flowed to the south and from the north of Bald Mountain to the north. The water courses and the dip of the quartzite show this to be the case. Present conditions are exactly the opposite of the original conditions. The original dikes all have a north and south course, while a few of the later dikes near the base of Bald Mountain have an east and west course and the ore bodies or nine per cent. of them have a north and south course.

These ore bodies vary in width and thickness; we find some of them over four hundred feet in width and various thicknesses, from six to twenty feet, and of various values, ranging from five to fifty dollars. The general average of what we call smelter ores are about twenty dollars per ton and a general average for cyanite ores in the neighborhood of eight to ten dollars per ton.

To describe the conditions of the quartzite we may compare them with the waves of the ocean. Some places we might imagine there was not much wind making the quartzite smooth, and then a big wind



lifts the wave up from two to three hundred feet, the quartzite raises the same, some places we have one hundred feet from that to two hundred feet or more across the top of it, going down again some places almost at a vertical, or some places with a gradual slope, others with steps.

We find these ore bodies at the base, on the steps and slopes most times on the top of these large uplifts, but very seldom find any ore bodies in the channel proper. And it appears that the most of the level places in the quartzites seem to be capped with large sheets of porphyry, but at every fault and in close proximity to a fault. The capping is most all composed of shales and sandrocks. No doubt this has a good deal to do with the occurrences of the ore along the breaks, those being in themselves an altered condition of these same shales and sandrocks.

There is no question but that this flat ore formation follows the lime stone ridge from between fifty and sixty miles on the south and about twenty-five miles on the west, and to Spearfish on the north.

This does not include all of the flat formation of the Black Hills. The Galena district has a very extensive area of this formation. The present developments there are very encouraging, although there has not been enough done to determine how large the ore bodies are, but they are numerous and the prospects obtained from most of them are good. There is still a very large area in those two districts undeveloped.

There is room for a good many mines such as ours, which is the Golden Reward Mining Company's property, consisting of over fifty miles of underground workings. About two-thirds of this mileage being on ore channels while the other third is cross cutting. After following some of these ore bodies close onto three miles we find them still continuous.

That in itself should be very encouraging to the people who wish to try to make their fortunes in this district.

PRESIDENT RICHARDS: Any of these matters are now open for discussion.

MR. LYNCH, OF MONTANA: My understanding in the early proceedings this morning was that the Committee on Resolutions would meet at 11 o'clock. As it is now past that time, I move you that we now adjourn so that this Committee may go to work. They have important matters to consider to be afterwards presented to this body for its consideration, and I move that we now adjourn until two o'clock this afternoon.

PRESIDENT RICHARDS: The Program Committee have arranged that we be here at 1:30 so I make the suggestion at this time that we ought to meet at 1:30 if it is agreeable to you.

MR. LYNCH, OF MONTANA: I accept the suggestion and make that amendment to my motion.

The motion was duly seconded and carried and Congress adjourned to September 9, 1903, at 1:30 P. M., at Lead, South Dakota.

Lead, South Dakota, September 9, 1903, 1:30 P. M.

PRESIDENT RICHARDS: Congress will be in order.

PRESIDENT RICHARDS: The first on the program is an address of welcome by the mayor of Lead, Hon. E. F. Irwin:

HON. E. F. IRWIN: Mr. President, Members of the American Mining Congress, Ladies and Gentlemen: It is a rare privilege for the city of Lead to welcome such an assemblage of mining representatives to our city, and I am sorry that I have not the gift of eloquence to tell you so in words, as we feel it in our hearts.

Yesterday we were welcomed into our commonwealth by our honorable governor, Charles N. Herreid. You were also welcomed into the gate city of the Black Hills by our genial and esteemed neighbor, Mayor McDonald, of Deadwood, both welcomes being clothed in beautiful language. Here you are welcomed as the weary and foot sore prospector, entering a new Eldorado, is received at the hands of the miner at the door of his hospitable cabin, when he says: "Shake, pardner; come in and help yourself, everything is yours as long as you stay here." We are outside of the general line of travel across the continent. We are a little world all by ourselves up here. Every man is at peace with his neighbor and all work for the common good.

We recognize the value to us here as mining men of such a gathering as this and we know that while you are learning and exchanging knowledge among yourselves the pleasure is ours and we are glad to greet you here. We know that every citizen in Lead joins in this greeting. When I tell you that we have over 2,000 men on our pay rolls here that does not mean just the mere figures. It means a large city of contented workingmen—men drawing the best wages anywhere in the United States; men who are just as much interested in seeing continued success and welfare of the Homestake as if they were stockholders of the same. Men who own the homes in which they live; men who have grown gray and old in the service of this company and who are not only building for the present generation, but for that to come. They can point with pride to over \$1,000,000 deposited in the local banks here in personal deposits and also to one of the best school systems in the state of South Dakota.

Governor Herreid said yesterday in his speech that the great Homestake mine was in South Dakota. I suppose every man in Deadwood has told you that the great Homestake mine is near Deadwood. Now you are right over that mine. You are surrounded by the buildings of this great company's great plant. You are the guests of the workingmen of that company represented by one that never missed a pay day. (Applause.) The Homestake, as you know, is the greatest gold mine in the world. It has been quarrying out the rocks which make these Hills since 1877 continuously and never missing a monthly dividend in the twenty six years of its existence, so you know why we are contented and prosperous and why we are satisfied with our places and why we are all working and not talking. The relation we bear to Deadwood, our sister city down the gulch, is somewhat the same as the patient Irishman working on the section bears to his talkative wife at home—we do the work; she does the talking. Together we get out a pretty good living for our Black Hills families. (Laughter.) One is just as necessary as the other for our existence here in the Hills and woe be to the outsider that ever makes any criticism on either side.

This Mining Congress has been called together for your mutual good, but we expect to get a good deal of good out of it ourselves. We enjoy having you here. We feel that this meeting will be a benefit, not only to Lead and Deadwood, but to the whole Black Hills, and I anticipate that tomorrow we will have an influx of visitors here from local camps and local cities around here that will astonish you. They will all come up to enjoy a time with the delegates and to see the great Homestake mine and to know what the American Mining Congress is doing for the country.

I might present you, Mr. President, with the Golden keys to a golden city, but with true western hospitality, our doors are never locked. The latch string is always on the outside and you have only to lift the latch and walk in—always assured of a miner's hearty welcome. (Applause.)

**PRESIDENT RICHARDS:** The program committee has again selected me to respond to this address of welcome.

It is a peculiar privilege to respond at this time and in this particular place for the reason that I see here that this city is in the



lead in establishing the homes for miners, a thing that is not done in all the camps of this great west. Here you find that the miner seems to be contented. He has a home and he will defend that home and he will make and see that the laws are enforced that protect that home. Therefore, it has had much to do in the state of South Dakota in establishing good citizenship because it provides that home life which adds stability and permanency to that citizenship. Also for another reason, I see the influences of this great Homestake in the little kindergarten—the most beautiful picture that I saw in this beautiful city on my visit here in May—maintained by a stockholder of that great corporation, influencing those little children to a higher citizenship and to a conception of what life's duties mean. I feel this influence again in the free library, again awakening and stimulating the youth to a higher citizenship. You cannot tell how far the influence of the Homestake in those particulars may radiate out into this great country.

Again, I see for another reason, that this great mine has established a permanency and a stability in mining of low grade ores that has not been equaled anywhere in our nation. It has given the miner confidence in the future of these great mountains. It has given capital confidence in the permanency and in the stability of mining and it has been the cause of investment of millions of dollars in mining, and by reason of its permanency and stability the mining world and investing world today are seeking for similar bodies of permanent ores in this great Rocky Mountain region. It has been the means of stimulating the great development of the great west and I hope that this Mining Congress will add its influence to the Homestake influence in helping the west to develop along western lines. (Applause.)

We have no quarrel with the east; we would do nothing for them but good, but we have dissimilar conditions out here and we have a right to insist that our home life, our business life and industrial development shall be in harmony with the conditions that surround us here. That is what we want and that is the great influence this Mining Congress must add to the influence of this Homestake. We scarcely know what the mighty development of this great Pacific means to this Northwest. When you see what influence this development may have out beyond the Golden Gate, on the bosom of the Great Pacific, in the islands of the sea, the Orient and Alaska with its gold, coal and oil and its development, you will find the influence of the Homestake reaches out in stability and permanency and it will result in bringing from these great mountains giants of men and women that will add a true and lasting wealth to this nation and will be its highest glory. (Applause.) We know that it will not be long and you and I have no idea of the development that will take place between here and the Orient in the next fifty years, but it must have men coming up able to meet that development and guide it along the paths of wisdom. You will find these men will come up from this western coast; they will spring up from these little cities of Deadwood and Lead and other cities of this great west. They are assisting in the development of its mighty water powers bringing light and comfort to every home. We can scarcely tell what the mighty development will be, but underlying all this material development is but a step and means to an end. We want this Mining Congress to extend the influence on the youth as the Homestake is doing through its kindergarten and its library and have this Congress filled with men that stand for something in this nation. They are the true and lasting wealth that comes out of this material development and I say that this great Homestake, over which you rest at this moment, has had an influence in this development that is going to reach out farther and farther and we have nothing to express higher than our gratitude at this hour that we have the permission to respond to this generous welcome. (Applause.)

**PRESIDENT RICHARDS:** The next on the program is an address by Hon. George P. Rogers, Director of the Mint, on the subject of "The Supply of Gold."



HON. GEORGE P. ROGERS: Mr. President, Ladies and Gentlemen: I have deeply appreciated this invitation from the representatives of one of the great productive industries of the country, but I have not expected to occupy your time very long. I had some feeling of alarm when I discovered how short the program was this morning but a corresponding feeling of relief when it was consolidated with this afternoon. I know just about enough of mining to know that if I should undertake to talk very long about it the tailings would run pretty poor. (Laughter.)

I am here, as the Secretary of the Treasury was here yesterday, in recognition of the importance of the mining industry and of the character of the men who compose this organization. As I came through my own state of Iowa on my way out here I found everybody in a state of suspense about the corn crop, and it occurred to me then that it was a good thing we did not have all our eggs in one basket, even though it was as good and generous a basket as the grand old state of Iowa. It is a good thing to have one crop that cannot be cut short by frost or eaten by bugs.

I am interested in your proceedings and especially interested in everything that pertains to the production of the King of Metals, to which all the mints of the world are still open and upon which the commerce and currency and finance of the world depend—gold. I am here as a customer for all you can produce and, fortunately, we can take all you can produce without impoverishing the treasury, and there is no magic about it either. (Applause.) There is no magic about it, for while the form of the transaction is that of a purchase, the government really acquires no metal and makes no investment. It receives the bullion, converts it into convenient form for use in the business world and, in effect if not directly, returns it to the producer. What you really get for your bullion is its exchange value in the commodities of the world. It is a very fascinating subject, this quest for the precious metals that has been going on since the beginning of recorded history; the development of commerce and of a common medium of exchange; the evolution, or if you please, the battle of the standards and the influence of the money supply upon the commerce, industry and civilization of the world. I suppose one could find as many varieties of opinion here upon that subject as he could get in a theological conference by introducing the subject of eternal punishment. We have threshed the subject pretty well over in this country in recent years. We ought to know more about it than any other people in the world. I suppose we know more about the seigniorage and the per capita than any other people on earth. It is not to be denied that the American people have always taken a very lively interest in the subject of money. We begin at an early age. Down in Philadelphia they tell the story of a school teacher who put this question to his class: "What grand old building is there in this city, the very sight of which is enough to quicken the pulse and stir the blood of every patriotic American?" And there was a pause, and then in a moment a boy's hand went up and the answer came back, "The Mint." (Laughter and applause.)

This much may be said now in justice to the sincerity and the intelligence of the disputants in the great debate over bimetalism, now apparently brought to a close; that the lapse of time has simplified and made things that thirty years ago were fairly subjects of doubt.

Thirty years ago the production of gold in the world was on a declining scale and twenty years ago it was at a low ebb. The output of gold in the world in the ten years from 1850 to 1860 averaged about \$132,000,000 a year. In the ten years from 1860 to 1870, about \$125,000,000 a year; in the ten years from 1870 to 1880, about \$115,000,000 a year, and in the five years from 1880 to 1885 it dropped to about \$100,000,000 a year. This steady decline in the output of gold caused many intelligent observers, statesmen and economists to doubt the wisdom of the movement for the demonetization of silver. The movement of the principal commercial countries of

the world to a common standard of value was an evolutionary one, it was as natural as the tendencies of the people who have intimate trade relations and intercourse with each other to use a common language. It was the natural result of the improved facilities of communication, of the invention of the steamship, the railway and the electric cable, but this decline in the output of gold covering a period of years presented a very serious problem. About that time some of the most eminent geologists in the world presented exhaustive arguments to prove that no reliance could be placed upon future gold supplies. They argued that gold had always been found near the surface, that there had been no considerable production up to that time from deep mines, that the great bulk of the output was from placers. They argued that the world had been pretty thoroughly explored and that no extensive discoveries were probable in the future. That was the basis of the argument for international bimetalism. I was a believer in it then and I believe today that if it had been necessary it would eventually have been accomplished. The subject got into politics and overstayed its time. While the world was debating whether or not there was gold enough for a universal standard of value, somebody went out and dug up enough to put an end to the discussion. So late as 1890 the production of gold in the United States was only about \$33,000,000 a year; last year it was \$80,000,000. In 1890 the output in Australia was about \$33,000,000; last year it was \$82,000,000. In 1890 in Canada it was \$1,600,000; last year it was \$20,000,000. In 1890 in South Africa the output was \$8,000,000; at outbreak of the Boer war it was at the rate of \$100,000,000. In 1890 the production of gold in the world was only about \$118,000,000. Next year with South Africa back to her old output the production of the world will probably reach \$350,000,000.

Prof. Shaler of Harvard has been quoted as saying that gold would eventually become so cheap that the world would have to demonetize it. I am not anticipating, however, that the responsibility of recommending it will fall upon me. The idea that the world may suffer from a flood of money is not one calculated to excite any very general or intense state of alarm. Most of us have never been over our knees in that kind of a flood and the average man, I fancy, would want it about chin deep before he cried enough. (Laughter and Applause.)

There is, however, no more interesting subject of inquiry and speculation than the probable effect of this new golden stream upon the markets, upon wages and upon the varied relations of individuals and classes and upon the social life of the people. In so far as an increased money supply and the expansion of credits that always accompanies it goes to support growing industries and to promote the orderly and natural development of the world's resources it is a good thing. Whatever stimulates enterprise helps to take up the industrial slack. But of course there is a point, if you conceive of its ever being reached, when every man is at work, when all the productive forces of society are already in full action, when you cannot make the world richer by pouring money into it.

If the point is reached where every addition simply means dilution, where the new supplies only find employment by increasing the value of the old stock, then you have a condition where all the relations based upon terms of money are disturbed, where speculation instead of industry is promoted, where adventure and economic waste run rife and it all ends in a general disaster.

There have never been but two periods in the history of money metals that afford any comparison with the present. One of them is the period following the discovery of gold in America, and that is so far back and the conditions of society were so radically different from those existing today that any conclusions drawn therefrom must be of the most general character. The other is the period following the discovery of gold in California and Australia. At the



time of the discovery of gold in America the supply of the precious metals in the world was exceedingly scanty. Whatever the civilized countries held at the downfall of the Roman Empire was apparently scattered and dissipated by the barbarians and utterly lost. In the long centuries of disorder that followed the downfall of Rome the working of the mines was practically abandoned, commerce was dead, the feudal lords received tribute in kind and the common method of exchange was barter. It has been estimated that at the time of the discovery of America the output of both metals, gold and silver, in the world did not exceed \$500,000 a year. During the first thirty years after the discovery of America the receipts of bullion in Europe from both Americas averaged about \$250,000 a year. For the next twenty-five years, from about 1520 to 1545, the receipts averaged about \$3,000,000 a year, and in 1546 the rich discoveries of silver in Peru raised the output to about \$10,000,000 a year and it never afterwards fell below that. Now that was an output that in its relation to the old supply could fairly be called a flood. Its first effect was demoralizing upon society. The organization of industry at that time was not elastic enough to permit of its being absorbed. In fact, the countries of Europe at that time were not organized for industry; they were organized for war; the common occupation of mankind was war, ambition and fanaticism kept Europe embroiled in constant strife and the treasures that America poured into Spain simply went to fill the war chests of Philip II for his campaign in the Netherlands and to build the great Armada. It has been said by an eminent economist that it took the people of Europe 300 years to learn that the true use for the precious metals was to support industry rather than war. It has been estimated that in the 150 years from 1500 to 1650 the average depreciation of the precious metals was about two-thirds of their value. That is, that in 1650 a given amount of gold or silver would buy only about one-third as much as in 1500. Naturally, extreme confusion was the result. There was great suffering among people who worked for wages or whose income was a fixed one. There is no doubt that the quarrel between Charles I and his parliament was promoted by the declining value of the money in which the revenues were paid and some historians have held that it was the deadly money question, the bane of politicians in all ages, that cost him his head.

In the 200 years from about 1600 to the beginning of the nineteenth century the output of the precious metals, principally silver from the Americas, gradually increased until at the beginning of the nineteenth century it averaged about \$40,000,000 a year. This was principally silver, and the monetary systems of Europe all became established at that time upon silver. In 1820 gold was discovered in the Russian possessions in the Ural mountains and in Siberia and in 1848 that empire was producing about \$20,000,000 a year. In 1848 came the discovery of gold in California and in 1853 in Australia and the output of those two countries immediately jumped to about \$100,000,000 a year, and then began one of the most extraordinary periods in the history of the world's development. The first sign of the new influx was seen in the holdings of the Bank of England, which went up from about \$40,000,000 in 1847 to \$118,000,000 in 1853. The bank put down the rate of interest, in order to get the money into use, to 2 per cent and for a considerable time to 1½ per cent and so general was the opinion that the new supplies had permanently reduced the rate of interest that Mr. Gladstone, who was then chancellor of the exchequer, offered a measure reducing the rate or providing for the refunding of the consols at 2½ per cent and the rate of exchequer bills was fixed at 1½ per cent.

But the idea that the rate of interest is permanently reduced by an additional supply of money is an error. Interest is a payment in kind. It is a percentage of the thing borrowed, and if the principal suffers depreciation in comparison with other commodities the interest payment suffers the same depreciation with-

out any reduction in rent. The interest rate depends upon the supply of cash capital compared with the demand for it; it depends in large measure upon the opportunities for investment and in a large degree upon the confidence, courage and enterprise prevailing in the community. Secretary Shaw coined a new phrase and a very happy one in Chicago the other day when speaking of our present period of prosperity. He said that if there was any reason for its cession or interruption it was a sociological and not a logical reason, and so some of the influences that effect the rate of interest are sociological as well as logical. The first effect of an increase in the money supply is to reduce the rate of interest. The supply piles up in banks and the banks are eager to get it into use and reduce the interest rate but a permanent reduction of the rate of interest has a tendency to enhance the value of all property that brings a fixed return. If store buildings in Lead will bring 15 per cent on the investment and the rate of interest is only 6 per cent or 8 per cent the store buildings will go up in value or there will be more of them built. If Chicago & Northwestern railway stock pays regularly 8 per cent when the going rate of interest is only 4 per cent, Chicago & Northwestern stock will raise in value, or there would be more railroads built or something will occur to bring down the rate of dividends. A permanent reduction in the rate of interest creates a boom in property, stimulates enterprise and construction and the creation of new securities until the new supply of securities bears down the price of property and raises the rate of interest. We have witnessed a demonstration of all that in this country in the last five years. I remember when the rate of interest on the farm mortgages in Iowa was reduced to 5 per cent in 1897. The effect was to enhance the value of farm lands and incidentally to start a new movement of immigration toward the cheaper lands of Minnesota and the Dakotas and even over into Canada, and about the same time a very general movement started for refunding the obligations of railroad companies at  $3\frac{1}{2}$  per cent to 4 per cent that previously had been drawing 5 per cent to 7 per cent and the result of that was an extraordinary period of construction largely of reconstruction until nearly all the railway lines of the country have been reconstructed. When these trunk lines were first built the main consideration was to get them built cheaply. With the accumulation of capital and a reduction in the rate of interest the main consideration is to operate them cheaply and the result is the general reconstruction that has been going on in the last few years. The extraordinary movement of capital however, into fixed investments has gone on until it has had the effect of increasing the amount of indebtedness in proportion to cash resources until it has again raised the rate of interest and reduced the value of railway stocks and other fixed investments. The people however who fancy that there must be a long period of depression to follow this period of expansion are very likely not to give sufficient importance to the annual additions to the money supply. With some \$350,000,000 a year added to the monetary stock of the world it is going to be pretty difficult to depress prices very long or suppress enterprise very long, particularly when we remember that with the modern banking conditions every dollar of cash capital is good for about four dollars of credit.

The period following 1850 in Europe witnessed a good deal such a boom as we have seen in this country in the last five years and there was a very general discussion as to the ultimate effect of the new supplies of gold. An eminent French economist named Chevalier wrote a very exhaustive book on the subject in which he argued that if the output continued it would be necessary to demonetize gold. Holland and Belgium actually took action to that end. Two influences, however, appeared to minimize the effect of the new supply. The first was the war in the Crimea, between Russia on one side and England, France and Turkey on the other. France



and Great Britain were obliged to finance the war, pay the expenses not only of their own troops to Turkey and Russia but they were obliged to ship large sums of specie to the eastern part of Europe and that money was scattered there and never came back. The other influence was the outflow of silver from Europe to India. Prior to 1855 the annual exports of silver from Europe to India averaged about \$10,000,000 a year. About 1855 began the construction of the railway system of India and immense sums of British capital were transported in the form of silver to India for that purpose. Then the construction of the railway systems assisted the transportation of grain to the sea coast and so increased the exports of India that it built up a large balance of trade that had to be settled in silver. Prior to 1855 the average exports of silver to India had been about \$10,000,000 a year and in 1857 it jumped to \$100,000,000 and that continued for the next ten years. It has been estimated by some statisticians that in those ten years exports of silver to India amounted to 75 per cent of the new production of gold and silver, the silver taken out of circulation and gold substituted for it. This sluiceway for silver for the east made room in Europe for the new supplies of gold. So, Mr. Chevalier had an opportunity to say that what he had predicted would have come true if something had not happened, and you may have noticed that the value of predictions is greatly impaired by the fact that something generally does happen. But precisely what happened then is certain to happen in the future. The times were never so favorable for the development of the hitherto backward countries as they are today. In all the advanced countries, equipped with labor saving machinery, the production and accumulation of wealth is going on at a rate that is almost incalculable. Everywhere in all these countries it is difficult to find employment or investment, for the savings of the people. This fact is the impulse behind the latter day effort of all European countries to obtain colonies. It is to find new and profitable fields for the investment of the savings of the people. Some of the richest portions of the earth up to this time have remained comparatively untouched and are ready today by the investment of capital to pour their treasures upon the world. South America, Africa, Asia and Eastern Europe are all promising fields for the investment of capital. Right at our own doors we have an example in the case of Cuba. Cuba has remained for four hundred years an object lesson of human misery and industrial waste. By the intervention of the United States the scene is changed. With security for capital, with employment for labor, with education and justice for her people, Cuba is to become one of the garden spots of the world.

Over in Egypt we have just had an illustration of what the investment of capital can do for a backward people in the construction of the great dam in the upper Nile at an expenditure of millions of dollars. It is expected to add 25 per cent to the agricultural products of Egypt. In India there is a further example of what the investment of capital has done for that country. No native government in India ever did anything for the development of the country or for the amelioration of the people. No prince in India ever built even a mile of wagon road. The present government has built some 25,000 miles of railway, over 35,000 miles of irrigating canals and only recently it has been announced that the government is prepared to expend \$150,000,000 in further irrigation projects. The exports of India since the construction of its railway system began have risen from about \$80,000,000 a year to \$360,000,000 a year. And so in Japan, in China and in the Philippines the quickening influence of modern enterprises are to be found. In these days of swift and easy communication when commerce has brought the most distant people into touch with civilization, it is simply impossible that great areas of fertile land and great stores of natural wealth should go on unproductive. This continent of North America could not always remain a hunting ground and battlefield for savages. The

development of these new countries will be facilitated by a plentitude of money and the development of the new supplies of the precious metals.

It is not only true as to gold but there is hope and prospects for silver. The fact that the world has generally adopted the gold standard does not mean that it has discarded silver as a money metal. There is a natural division between the fields and the functions of the two metals in the monetary world. Gold is the natural money for the international trade, for large transactions, but silver is the natural money everywhere for the retail trade. If I could have my way there never would be a gold coin under ten dollars. I paid out a five dollar piece for a newspaper in California last year and I have been against the five dollar piece ever since. (Laughter.) The development of all these backward countries to which I have referred will involve a larger market for silver. A country where the wages of the people are small, where they do not get over three or four dollars a month, has little use for gold as a common medium of exchange. We began buying silver for the Philippine Islands in April at 49 cents an ounce. We paid last week 58½ cents an ounce. I would not advise anybody to go and buy a silver mine on the strength of my opinion upon it but I do believe that silver has seen its worst days and that it may be expected to have a fairly stable value in the future. (Applause.)

The United States as you know is one of the three great gold producing countries in the world and yet in the last five years it has attracted and held a good deal more than its own output. The entire output of Canada, of Mexico and a large share of Australia comes to the mints of the United States. It has flowed into the treasury until we can hardly shut the vault doors. The treasury of the United States holds today the greatest hoard of gold that ever was gathered together on the face of the earth. It has buttressed our monetary system with the strength of Gibraltar. It is the guaranty of the parity of every dollar of our money, of the discharge of every obligation that the government may have.

Before I close I want to express my thanks to the mining fraternity generally for the courtesy and the ready response that they have always given to the bureau over which I have the honor to preside in its inquiry as to the annual production of the precious metals. I might say further that I am aware that there has been more or less criticism from time to time upon the estimates that are made by the bureau. We are never quite able to get up to the enthusiastic estimates that the mining fraternity put upon their own districts. We figure that all the gold that is produced in this country must go to three uses. It either goes to the mints for coinage, or it enters into industrial uses or it is exported from the country. You cannot fool us very much on what comes to the mints. We are in touch with all the refineries, smelters and reduction works of the country and they very kindly furnish us with a statement of what they furnish for the industrial arts, and not relying wholly upon that we conduct an inquiry by means of some 20,000 circular letters every year, addressed to the manufacturing jewelers and other people in the country who use gold and silver in the industrial lines. We get the exports of gold and silver from the custom houses and have reason to rely upon them. In compiling our estimates of the output of gold in the several districts in the whole country we figure that we must hold the total down to the actual disposition as we find it, and we distribute it among the states according to the information we get from the various reduction works, smelters, refineries, etc. If the criticisms that our estimates were too low came from only one district we might think something of it but when the criticism comes from all districts and we cannot find out where the product has gone to we come to the conclusion that our figures are probably about right. It is of the highest importance, of course,



that the statistics should be as nearly accurate as they can be made and while it is impossible to get them absolutely so, we believe that they are approximately correct.

Now, gentlemen, I desire to thank you again for your invitation, for your courtesy in listening and to express the pleasure I have felt in coming into this great mining district of the West, in being a witness to the amount of labor, of patience, of scientific skill and of capital that has combined to furnish us the output that comes from these Hills.

Gentlemen, again I thank you. (Prolonged applause.)

MR. CONZETTE, OF SOUTH DAKOTA: Mr. Chairman, in harmony with Director Roberts' remarks and also in harmony with the declaration of the constitution of our organization which is said to be organized for the purpose of advancing the mining industries of this country, I desire to offer a short resolution.

The resolution referred to was read by Secretary Mahon and by the president referred to the committee on resolutions.

MR. GUSHURST, OF LEAD: I am sure I express the sentiment of every person within this hall when I say that we were delighted at the very able and interesting speech which we have just heard by Mr. Roberts and therefore I move you, Mr. President, that a rising vote of thanks be tendered to Mr. Roberts, not only for his presence with us here today, but also for the very interesting speech that he has given us.

The motion was duly seconded and unanimously carried.

PRESIDENT RICHARDS: The next on our program is a paper by Dr. F. R. Carpenter, of Denver, Colorado, on pyritic smelting. As Dr. Carpenter is not present to read the paper, it will be submitted to the secretary for printing.

#### PYRITIC SMELTING.

A paper prepared by Dr. Carpenter for the American Mining Congress.

This is a process of smelting applicable to any raw ores not carrying lead, but more especially to sulphide ores carrying copper.

From time immemorial man has roasted off the sulphur in pyrite ores and burned his iron to oxide in the open air, thus wasting what pyritic smelters consider good fuel. If it is admitted that a heat unit derived from the oxidation of iron or sulphur will do as much work as one derived from oxidation of coke, the folly of this proceeding becomes apparent, provided this heat can be utilized. If it can, one might just as well waste his coke in a similar manner.

American engineers derived from Europe two raw smelting processes, which, unfortunately, are often confused. One was the Kongsberg process of pyritic smelting, where raw pyrite was added to the charge simply to produce a carrier, or matte, for the precious metals. This was all I had in view when I advocated pyritic smelting for the siliceous ores of South Dakota. By its means the small amounts of gold and silver in many tons of rock were concentrated into a few tons of matte. This process, broadly, is very ancient—so ancient that we know not when it was first employed. It will be observed later that it is the very opposite of the other class of pyritic smelting, in that the ores treated are silicious, and pyrite is added for a carrier only.

The other sort of pyrite smelting is the outgrowth of principles discovered by Sir Henry Bessemer in steel making, who found that cast iron might be purified by the oxidation, or burning, of its own contained impurities. The principles of Bessemer, much modified, are now everywhere applied to the refining of copper matte, where again the oxidation of the iron and sulphur furnish the heat to burn and slag off impurities, giving us a very pure blister copper at one

direct cheap operation, and without additional fuel. This is the beautiful operation of Mahnes, first employed in America by our Butte friends.

After the establishment of Bessemer's process in England, Hollway sought to smelt the Rio Tinto copper sulphide ores by means of the heat generated in the oxidation of their sulphur and iron. A short calculation will show that his conclusions were well founded. Without going into the investigation very fully, we may admit that one pound of iron pyrite burned in the furnace is equal to 2.026 B. T. U., and that this, roughly, is equal to 40 per cent of the value of a pound of carbon burned to CO; but as our furnaces probably burn perhaps a third of the carbon to CO<sub>2</sub>, we may conclude that this value is too high, hence figure it as equal to only 26 per cent, or one-fourth of the value of one pound of coke, which is certainly a safe deduction.

Those who are interested in the subject are referred to the forthcoming volume of the Mineral Industry, where Mr. E. C. Reyhold, Jr., a young man employed at our Golden Works and formerly with me at Deadwood, has fully investigated the subject.

For every four pounds of pyrite, therefore, burned in the open air, we have lost the equivalent of one pound of good coke. Stated in another way, four pounds of pyrite will do as much smelting as one pound of coke, and in so doing, it is smelted and fluxed itself.

Our blast furnaces, in ordinary matte smelting, are running with 16 per cent coke, but a charge containing 64 per cent of raw pyrite should smelt itself; and if this is assisted with a hot air stove, which can be fired with a cheap low-grade fuel, even this percentage of pyrite may be much reduced. The fullest application of these principles has been made by Dr. Robert Steicht, of Mount Lyell in Tasmania, where the first smelting is done absolutely without carbonaceous fuel of any sort. Let us now consider for a moment what they do.—Their ores are pyritic, and of two classes. The Mount Lyell pyrite is so mined as to maintain a general average as follows:

Fe .....	40.30 per cent.
Si O <sub>2</sub> .....	4.42 per cent.
Ba SO <sub>4</sub> .....	1.48 per cent.
Cu .....	2.36 per cent.
Al 2O <sub>3</sub> .....	2.04 per cent.
S .....	46.01 per cent.
Ag .....	2 oz. per ton.
Au .....	0.0725 oz. per ton.

The second class is a silicious bornite ore purchased from other mines, and quartz is employed as a flux. This is the direct opposite of the case first considered, calling for additions to silica in the place of additions of pyrite.

The Mount Lyell company operates eleven blast furnaces which are arranged in two smelting plants. Those employed in the first smelting are five in number, and are 42 by 210 inches at the tuyeres. The height of the ore column above the tuyeres is maintained at 9 feet 6 inches. The other plant consists of six furnaces, five of which are 40 by 168 inches at the tuyeres. The tuyeres are all three inches in diameter, and the larger furnaces have 32 each. In the first set of furnaces all the ore delivered at the plant is smelted without roasting and without fuel, to a first matte carrying 15 per cent copper. Formerly a hot blast, 528 degrees, and 3 per cent coke was used. But for a year past the coke has been abandoned and the blast only warmed. No difference was noticed in this change save a greatly increased capacity—three furnaces now doing the work of four under the old method.

The matte from this first smelting is re-smelted in the second set of furnaces to a 45 to 50 per cent copper matte, which goes directly to the converters.



The process is, therefore, divided into three stages, all of which are oxidizing, and which may be said to be almost continuous Bessemerizing from beginning to end. Disregarding the time for cooling and transportation from one department to another, the time consumed from ore to copper is not six hours, and this is accomplished almost without extraneous fuel.

In the first smelting no limestone or coke is used, and but a slightly warmed blast. In the second smelting a small percentage of coke and limestone is used, and a cold blast. The third stage is simply Bessemerizing or converter work.

These results having been attained at Mount Lyell by the application of principles long advocated by pyritic smelters, there is no longer any reason, in my opinion, why the same or similar results cannot be had at Sudbury, Ontario; Ducktown, Tenn.; Keswick, Cal., and in Arizona and New Mexico—in fact at any place where the ores carry sufficient pyrite, or pyrite can be had from outside sources.

It will be observed that the smelting proper at Mount Lyell is accomplished in two steps. A low-grade matte is made in the first smelting, which is enriched by a second smelting to a grade high enough for the converter. This in a differently constructed charge may not be necessary,—depending upon the per cent. of copper, degree of concentration and the proportion of iron to silica. A charge can be made of Montana ores which will not require the second, or concentration smelting; but the second smelting, being relatively small compared with the first, is never a serious matter and adds but little to the cost.

I have now sketched the two outside cases of pyritic smelting, both of which are eminently successful in their respective fields. There are many cases, however, which lie between these extremes, as at Butte, Mont.; in Gilpin County, Colorado; British Columbia and elsewhere, where the sulphide ores carry a large percentage of silica, and are treated by water concentration before smelting. This presupposes concentration mills of enormous capacity and roasting furnaces for the concentrates so obtained, both of which cost great sums of money, and which are at very best wasteful. By the further application of the principles already developed and the utilization of the cheap fuel now wasted, it is barely possible that the process might be modified.

Modern copper smelting methods have received their greatest development at Butte, and I will let no one go beyond me in admiration of the great work done there and sincere respect for those who have accomplished it. Their mills are models of mechanical ingenuity never surpassed, and their reverberatory furnace work is not elsewhere equalled. I do not lose sight of the fact that these last furnaces, which a few years ago, when first introduced from Swansea, had a hearth capacity of but 9 by 14 feet and a smelting capacity often as low as ten tons per day, requiring to be clayed up every twenty-four hours, have now been developed into furnaces having hearths 20 by 50 feet and smelting more than 100 tons each in twenty-four hours, and which require claying not more than once in twelve days; also that they save more than 50 per cent of the fuel used in the old furnaces. It is, therefore, with the greatest confidence that I suggest that any change is possible in the methods of a camp which is today without a peer in the world for the excellency of its work—but let us not forget history.

"The old order changeth, giving place to new."

Seemingly small things in metallurgy have often accomplished the greatest results.

A few years ago there was still running in Savoy, a small iron blast furnace blown by a trompe, or box in which falling water compressed air by entangling it in its fall—a blower which we may readily imagine neither heated the air nor dried it, yet the addition

of this blowing machine, crude as it was, made the instrument which put out of blast all the Catalan direct furnaces in every part of the world. Without the trompe the blast furnace for iron would probably not have existed, and without pig iron all that is known to us now as the "age of steel" could not have existed.

Already three-fourths of the beautiful ancient Welsh copper process, with its roastings and re-smeltings, to which the reverberatory furnace belonged, has gone by never to return—the one operation of converting having replaced them all.

I believe that when Hollway undertook to smelt the Rio Tinto copper ores without fuel other than what they themselves contained, he laid down a principle which will ultimately make every copper roasting heap and roasting furnace as useless as the Catalan forge, and the time is near at hand when one would no sooner waste his good iron sulphide fuel than he would his good coke. Already more ore is smelted raw at Butte than formerly. The first-class copper ore and the coarse concentrates go into the blast furnace raw—a tribute, as far as it goes, to pyritic smelting. But if the principles here maintained are correct, the large concentrating mills and roasting furnaces will gradually be replaced by a process that is all one of fire, and that fire largely derived from the oxidation of the now wasted pyrite.

I have done what I could to secure the actual composition and cost of treating an average ton of Butte ore, as it is broken at the mines, that I might make a comparison between the all-fire raw method here advocated and the combination water concentration-smelting method now employed.

The following may not be absolutely correct, but it will do for comparison. The ores of this district, according to a recent paper, are mined in two classes. The first are said to average from 10 to 15 per cent. copper, and to constitute ten per cent. of the ores raised. The second class comprises the remaining ninety per cent., and yields from three to six per cent. copper. If all were broken down together, we may take five per cent. as the average, and 30 to 40 per cent. silica with the alumina, alkalies, sulphur and iron to balance.

I have arrived at the present cost per ton of ore from the testimony of Mr. Frank Klepetko, in March, 1898.

Dressing (or water concentration) per ton of ore, 82 cents; roasting concentrates derived from a ton of ore, 38 cents; smelting calcines derived from a ton of ore, \$1.20; total, per ton of original ore, \$2.40.

In the water concentration he stated the loss to be 18 per cent.; in the roasting, 2.6 per cent.; in the smelting, 4.2 per cent.; total, 24.8 per cent.

With copper at 14 cents per pound, this is worth \$3.47, making the total cost, including losses, \$5.87 per ton of original ore.

If this ore were smelted direct as it comes from the mine, without concentrating or roasting, by the addition of limestone and coke and the application of hot blast, it would cost fully as much per ton of ore, perhaps more; but I am sure that three dollars per ton will cover it. This is more per ton, but I estimate a greater saving. According to the above statement there was lost, in the concentrating, roasting and smelting 24.8 per cent. of the original contents of the ore by the time the copper was raised to a grade sufficiently high for the converters—against which I figure but 9 per cent. in direct smelting, leaving a difference of \$3.47 minus \$1.26, equal to \$2.21 gain per ton. As this gain is wholly in the copper, it adds a proportional length of life to the mines. If, however, the one smelting can not be done for the cost of concentrating, roasting and smelting, this gain would be reduced by the difference. If the first smelting cost \$3.00, which I am sure is ample, we should still have a gain of \$1.60 in favor of raw smelting, always supposing these figures to be correct.

In our prejudice for the established methods, it will be well to remember a story told by a traveler from the Sahara Desert. He came across a party of Arabs making iron—doubtless after a manner dating



from the days of Abraham. The furnace consisted of a hole in the ground, around which were three blowing engines, each consisting of an Arab with a long tube, one end of which was in his mouth and the other in the furnace. After blowing, from six to eight pounds of iron per shift was obtained.

Our traveler was much impressed, but inquired of the boss metallurgist, "Why do you use this method of making iron?" He received a look of withering scorn and the reply, "What other method can there be? Neither our fathers nor ourselves ever heard of any other."

Because our fathers and ourselves have always burned our iron and sulphur outside of the furnace is no good reason for continuing it.

F. R. CARPENTER.

PRESIDENT RICHARDS: We are to be congratulated that the officers of the government of the United States have taken an interest in the efforts of this Congress to stimulate the mining industry, by sending some of its most noted men. We have with us a gentleman who was a member appointed by the President, of the board of arbitration of the great anthracite strike in the east that so interested every community throughout this land. I mention this, not because Mr. Parker needs any introduction, but because I want every man in this community, who is interested in the great labor question to know who will address them. You will therefore be addressed now by Hon. E. W. Parker on the subject of Coal.

HONORABLE E. W. PARKER: Mr. President, Ladies and Gentlemen: I have been placed on the program to talk about coal. The subject is a very broad one than cannot be covered in an address before an assembly of this kind without occupying a great deal more time than I consider I was required to give to it. I have taken a very small corner of the field and it relates principally to what we are going to try to show at the St. Louis exposition, what we have in the way of coal mining resources.

On May 1, 1904, the gates of the greatest World's Fair and Universal Exposition the world has ever seen will be opened at St. Louis, Mo. When the Louisiana Purchase Exposition is spoken of the first question asked is: "How is it going to compare with Chicago?" Many visitors to that great show, myself among them, firmly believed that the exposition business had attained the acme of success in the White City of Chicago. Few if any, would have had the courage to suggest that within a half century at most, a greater exposition would be thrown open to the world. But the seemingly impossible is being accomplished. Chicago is being outdone. A decade has scarcely rounded out since we walked with ever increasing wonder through the great buildings of the World's Columbian Exposition, gazed with almost speechless awe upon the splendors of the illuminated Court of Honor, and amused ourselves among the mysteries of the Midway Plaisance, and now we see rising at St. Louis another and a greater dream city. And when this is said, it is said without exaggeration. One has but to see the remarkable progress already made in the construction of buildings and the preparation of the grounds to be convinced that St. Louis is not only determined, but is going, to surpass all previous efforts in the way of International Expositions.

It is not my intention to present here an address devoted to the general advertising of the World's Fair. We leave that the Bureau of Publicity. But when one is connected officially with such a gigantic enterprise, however unimportant his position, he may be pardoned for assimilating a part of the enthusiasm which appears to inspire those having the cares and responsibilities of management.

The portion of the St. Louis Exposition in which this Congress is most directly interested it naturally the Department of Mines and Metallurgy. The general scope of the work of this department will be presented to you in more extensive detail by Prof. J. A. Holmes, its

chief, who will arrive this evening, and I shall confine my remarks to the particular branch of that department which comes directly under my charge, that of coal.

The lesson learned through the wonderful industrial development of the United States during the last quarter of the 19th century is that to our coal mines more than to any other one cause is due our present supremacy among the Nations of the earth. In a recently published volume on the adjustment of wages, Prof. W. J. Ashley, of the University of Birmingham, England, comments on the former superiority of Great Britain, which was founded on her coal, and shows how, since 1889, the United States has outstripped that country in iron and steel manufacturing and that we are forging farther and farther ahead, not only of Great Britain, but of the world—simply because of our wealth in coal. How many of you are aware that in 1901 the United States produced practically 40 per cent. of the entire world's supply of pig iron, and 44 per cent. of the entire output of steel? In 1902 this country added nearly 2,000,000 tons to the pig iron product of 1901, and reached a total of nearly 18,000,000 long tons. How many of you are aware that in 1902 we produced almost exactly double the amount of pig iron made in this country in 1892, ten years before, and about four times that made in 1882? How many of you are aware that in the first half of 1903 the furnaces of the United States turned out pig iron equal in amount to that produced in all the other countries of the world in a similar period for 1901? This great development is due in large part to coal. Our vast deposits of iron ore would lie unprospected and undeveloped but for the coal which reduces them to workable iron and steel. Without the coal the steel would not be made for our railroads nor would there be the locomotives to draw the trains. It is coal which moves the world today, not gold. Gold and silver lubricate the wheels, and that is very important, I grant you, but coal makes the power.

Now, what are we doing in the development of that power? We look at the statistics of production and we see that our coal mines produced in 1902 a total of 293,300,000 short tons of coal. We are accustomed to talk in millions now-a-days and consequently these figures may not sound impressive, but let us see what sized mass this product represents. If this one year's product were gathered in one large heap and measured it would make a mountain containing 7,360,000,000 cubic feet. A pyramid at sea level built of this material and having a base a quarter of a mile square would reach an altitude of 12,672 feet or 5,860 feet (something over a mile) higher than Custer Peak. If put into a column with a rectangular base 1,000 feet on each edge (nearly a fifth of a mile) it would reach an altitude of 1.4 miles. The holes left in the ground by this excavating would contain a city two and three-tenths miles square, whose buildings averaged fifty feet in height.

How our coal mining industry has grown is shown in the record of the last thirty years. Those of us who remember so far back as 1871, thought we were doing some business at that time notwithstanding the fact that we were just recovering from the effects of the civil war. We produced in that year a little over 46,000,000 tons of coal. In 1881 we mined 86,000,000 tons, less than half that of our industrial rival, Great Britain, but nearly double our output ten years before. In 1891 our product had increased to nearly 170,000,000 tons, almost double that of 1881, while in 1901 we came within two per cent. of reaching 300,000,000 tons, outstripping Great Britain by nearly 50,000,000 tons, and exceeding Great Britain and all her colonies by over 25,000,000 tons. The United States is now contributing more than one-third the entire world's supply of coal.

In order to show how our coal mining industry indicates the great strides that we have made in manufacturers we may compare the statistics of coal production with those of our population. If coal mining in the United States during the past thirty years had merely



kept pace with our increasing population the production in 1901 would have been considerably less than 100,000,000 tons, whereas, it reached nearly 300,000,000 tons. In 1870 we had a population of 38,558,371 persons, and our total coal production amounted to 36,806,560 tons, showing a per capita consumption of less than one ton. In 1880, with a population of a little over 50,000,000 we produced 71,481,569 tons of coal, or one ton and 860 pounds for each inhabitant. At the end of the next decade our population had increased to 62,622,650 and our coal production to nearly 158,000,000 tons, making  $2\frac{1}{2}$  tons of coal to each person, and in the last year of the last century, when our population was a little over 76,300,000, we mined nearly 270,000,000 tons of coal, or more than  $3\frac{1}{2}$  tons per capita. In other words, while our population in 1900 was not quite double that of 1870, the coal product was 7.4 times as large. Our exports of coal do not amount to more than 4 or 5 million tons and hence do not effect these figures. The facts are worthy of consideration, for it must also be remembered that, with the increase in per capita consumption of coal, there has been an even greater increase in the production of petroleum; and natural gas, which was not used commercially before 1882, has for the past fifteen years been extensively utilized as a fuel and has displaced a large amount of coal.

It is but just that an industry upon which so many other industries, we might say the commercial life of the Nation itself, depend, should have proper representation at the St. Louis Exposition. Here are two great enterprises, and we must see that both should have their importance recognized. The Exposition will attract to it visitors from all quarters of the globe. Those from foreign countries come to learn something about us, and the majority of them will be of such calibre that it will pay us to show them something substantial, something that they will remember. It is with this idea in mind that we have prepared a plan for a collective and educational coal exhibit, the scope of which has never been attempted at any previous exposition. I must confess that when I first presented the plans to some of the leading coal operators and associations of operators, it was with a feeling of trepidation. It means the expenditure of large sums of money. Instead of discouraging the idea, it is exceedingly gratifying to state that the operators have in most cases entered cordially into the proposition and have given substantial evidence of their willingness to cooperate in the scheme.

A large space has been reserved in the Mines and Metallurgy building for the display of the exhibits representing the coal mining industry. This will be divided among the states according to the extent of their exhibits, and as nearly as possible according to geographical location.

An interesting feature of this coal display will consist of large relief maps of some of the principal coal fields of the country. It might be desirable to have such maps of all the coal mining region, but it is not possible to prepare them. Only such regions can be illustrated in this way as have been made the subject of topographical and geological surveys. It is possible, however, to obtain enough of such data and to prepare enough such maps to illustrate in a general way. These maps will show practically in miniature the country represented. They will show the hills and the valleys, the plains and water courses, the roads and railroads, the towns and mining camps, and the location of each mine in the region covered by the map. They will also show the surface and structural geology and the entire area underlaid by workable coal seams; and where possible, the portions of the region available for farming purposes and the sections covered by forest growths of economic importance.

Another interesting feature will be maps of two or three typical mining towns or camps illustrating the character of such communi-

ties in the different states. These maps will also show the tipples and other buildings connected with the operations of the mines, miners' houses, etc.

It is, of course, evident that the scale upon which such maps are constructed is very much larger than the scale upon which the relief maps can be constructed. It will mean in reality, showing in detail certain features indicated on the relief maps.

Then on a still larger scale, will be shown models of working mines in the different states and illustrating, so far as possible, typical conditions existing in those states. It is proposed, for instance, to show by such models drift mining by the pillar-and-room system as practiced largely in Pennsylvania, West Virginia and other Eastern States; shaft mining under the pillar-and-room system as practiced principally in Illinois and Indiana; slope mining under the pillar-and-room system, and under a modification of this system, as practiced in Arkansas and the Indian Territory; strip or open-work mining, as practiced to a considerable extent in Kansas and Missouri, and shaft mining under the long wall system as practiced in Kansas and Missouri, and also in Illinois. Wherever possible it is desired to show by figures, etc., the mines at work and to exhibit the different methods of hand and machine mining, methods of ventilation, underground haulage and hoisting, and the pumping or hoisting of water. It is also proposed to show the surface conditions and improvements in each case. The plan, generally, will be to show say about one-third of the model with the surface shown, and about two-thirds showing the mine as if the surface were lifted off, and the observer were looking down directly upon the workings.

The method of utilizing bituminous coal in the manufacture of coke will be shown by models of coking plants. In connection with this will be shown specimens of coal used in coke making and specimens of different grades of coke made from such coal. Also in connection with the models of coking plants will be shown working models of crushing and washing machinery illustrating the manner in which coal is prepared for coke manufacture, where such preparation is necessary.

Another feature which we think will prove of particular interest and value will be a collection of coal sections from most of the important seams throughout the bituminous coal mining regions. These sections will consist of rectangular blocks of coal from three to four feet on each edge and showing the entire thickness of the seam as it occurs in the ground. They will be cut out of the seams in solid blocks and will form a formidable array for the contemplation of competitive coal producing countries.

The sections will be accompanied by maps illustrating the area of country underlaid by the coal. They will also be accompanied by specimens of the coal as mined and prepared for the market. Then too, there will be samples showing the run of mine, and where the coal is screened before being sold there will be specimens of lump, nut and slack coal produced from the mine run. If the coal is used for coke making specimens of uncrushed and unwashed coal will be shown as compared with the crushed and washed coal, from the same mine.

As you all doubtless know, the United States is the largest coke producing country in the world. This coke being made from the bituminous coal in beehive and retort ovens. We produced in 1902 25,401,730 tons of coke and consumed in its manufacture 39,604,007 tons of bituminous coal. Consequently we will exhibit in connection with each section of coal, specimens of the coke made from it. And where there are different grades of coke, such as foundry, furnace or domestic, samples of each kind will be shown. All the coal and coke specimens will be accompanied by analysis and by certified statements of tests made of either the coal or coke for specific purposes.

What should not be forgotten in this brief description is that there will be a great display of machinery used in connection with the coal



mining industry. This will include machinery used in coal mining, haulage, pumping and ventilation; then overhead transportation, models of shipping docks, where the coal is handled from railroad cars to vessels, the whole being made complete by exhibits of automatic stokers and other mechanical devices for the economic handling and consumption of fuel and for the consumption and suppression of smoke. If by this latter feature the exhibition is able to do anything for the relief of the smoke-laden atmosphere of some of our larger western cities, it will not have been in vain.

PRESIDENT RICHARDS: I presume that every miner that comes here is deeply interested in the next paper as it pertains to all of the development of nearly every great interest in the west and this is by C. W. Merrill, of Lead, South Dakota, his subject being "The Metallurgy of the Homestake Ore." As soon as Mr. Merrill has delivered his address there are copies here for distribution that may be had by calling for them.

## THE METALLURGY OF THE HOMESTAKE ORE.

### I. THE PROPERTY.

The Homestake Mining Co. has acquired through consolidation the ground and equipment of the Father De Smet Consolidated Gold-Mining Co., the Deadwood-Terra Mining Co., the Caledonia Gold-Mining Co. and the Highland Mining Co., at and near Lead, Lawrence county, South Dakota, in the northern portion of the Black Hills. The company owns or controls 250 claims, comprising 2616 acres, and covering about 8000 feet along the strike of the lode.

At the surface there are several veins, of which three have united in depth, where the main vein ranges from 300 to 500 feet in width. The 1100-foot level is the lowest at present. The rock of both walls is, so far as known at present, carboniferous slate, and the country is penetrated by a system of porphyry-dikes, and in some places capped with porphyry.

The output of the company up to January, 1903, has been, approximately, \$70,000,000.

### II. THE ORE.

The oxidized, open-cut ore is nearly all treated in the three mills on the northern part of the property, which are as follows: The Mineral Point (formerly the De Smet), of 100 stamps, the Monroe (formerly Caledonia), of 100 stamps, and the Pocahontas (formerly the Deadwood-Terra), of 160 stamps. A cyanide plant, to treat the leachable portion of the tailings from these North End mills, has recently been installed and put into operation at Gayville, or Blacktail, as it is now known.

The Homestake lower-level ore, which comprises the greater part of that being milled at Lead, may be described as a horn-blende, garnetiferous schist or slate, which has been crushed and infiltrated with free silica and pyrites, the latter being about 7 or 8 per cent. of the ore, and comprising pyrite, pyrrhotite and traces only of chalcopyrite and arsenopyrite.\*

\* The standards used in this discussion are: the U. S. gold-dollar; the U. S. short ton of 2000 lbs. avoird., and the value of an ounce of fine gold, \$20.67. Percentages are given by weight, and not by volume. Sizings are classed as coarse (that portion of the sample which will remain on a 100-mesh screen; diameter of wire, 0.00433 in.; size of opening, 0.00575 sq. in.); middles (the material finer than the opening of the above 100-mesh screen, and coarser than the opening of the commercial 200-mesh screen as given below); and fines (the material which will pass such a 200-mesh screen; diameter of wire, 0.00216 in.; size of opening, 0.00312 sq. in.). A further subdivision of fines is also mentioned, which is based upon the granular, or angular, condition of one portion and the flocculent, or amorphous, condition of the remaining portion of these fines.

## III. MILLING.

The ore receives its first crushing in rotary breakers at the hoists, and this product varies in size from that of sea-sand up to rock having an extreme dimension of 4 inches. From bins at the hoists at Lead, the broken ore is trammed to the three mills, i. e., the Homestake and Golden Star, containing 200 stamps each, and the Amicus (formerly the Highland), in which there are 140 heads, making a total of 40.

From the mill-bins the ore passes to the mortar, which is of the now celebrated Homestake narrow pattern, where it is crushed between cast-iron shoes and dies, the weight of the stamp when equipped with new iron being 900 lbs., the drop  $10\frac{1}{2}$  inches, and falling 88 times per minute.

The screen is of the steel-needle slot-type No. 8, and the bottom of the screen-opening averages 10 inches above the top of the dies.

The long drop, high discharge and small area of screen openings produce an extremely fine pulp, about 80 per cent. passing a 100-mesh screen, and it is to the writer a most remarkable fact that under these conditions such a high stamp-duty is maintained, it being fully 4 tons per stamp per twenty-four hours.

This duty is possible only because: first, of the very favorable nature of the ore, the slate and pyrite crushing readily and the quartz being an excellent medium of attrition; secondly, of the large proportion of water used, being from eight to ten times the weight of ore crushed; and, thirdly, of the narrow mortar, which is only 12 inches wide at the lip.

This very fine and thin pulp is in the most excellent condition for amalgamating, which process is conducted both inside the mortar and outside, on full-size plates in series (each 54 by 144 by  $\frac{1}{8}$  inch) to each mortar. The first of these is a copper-plate, and the other three are silver plated copper, the weight of plating being 2 oz. per square foot, and all silver-plating being done at the works. The addition of the three silver-plates to each stamp battery by Mr. Grier has proven one of the most valuable steps in the treatment of this ore, and has brought about an additional profit amounting to, approximately, \$250,000 during the year 1902, over and above what would have been realized from amalgamation had the outside plate-surface been only that of the one copper plate—which, by the way, is considered ample in many of the large modern plants of the day.

In connection with amalgamation, the practice at the Homestake conforms, as far as conditions will permit, to the theory that the maximum results are obtained when the temperature of the water used in the batteries is low enough to exert the minimum influence on the minerals of the ore; and it is contended that the plate-yield proves the correctness if this theory.

It would be interesting to investigate the question of amalgamation and finer crushing in other gold-producing sections, particularly in South Africa, where the yield from this source is reported to be from 55 to 60 per cent., as compared with 70 to 75 per cent. at the Homestake. Perhaps finer crushing would not only greatly increase their amalgam-yield, but also reduce the values lost in their cyanide-residues. This seems the more likely for that country, because their slimes have been proved to have value sufficient for secondary treatment, whereas this has not yet been proved at the Homestake, where the advisability of sliming such a large proportion of the ore has been a debatable point, because the slimes here contain only \$0.85 to \$1.10 in value per ton. But of this more will be said later.

The total cost of milling in the 200-stamp mills at Lead is, approximately, \$0.40 per ton.

## CLASSIFICATION.

We now have a pulp containing eight or ten parts of water to one of ore; and much of the latter is so infinitesimally fine as to cause a visitor, who had watched an attempt to filter the slimes on a large



scale, to say that, for an exemplification of the size of a molecule, he would advise the study of Homestake slimes.

The tailings as they leave the mill are sized, with the following results:

Coarse (remaining on 100-mesh), 22 per cent.

Middles (between 100- and 200-mesh), 18 per cent.

Fines (passing a 200-mesh screen), 60 per cent.

That is, 60 per cent. of the particles issuing from the mortar have less than 0.00001 square inch of cross-section.

When the erection of the cyanide plant had been determined upon, the question of a tailings-wheel to elevate the pulp and permit the location of the plant nearer the mills being under discussion, it was calculated that to elevate the tailings at a cost of about 2 cents per ton would cost the company, approximately, \$140,000, on the proportion of the material then blocked out in the mine which would be available for leaching. In other words, for every cent per ton which could be saved in the secondary treatment of the leachable material, the company would profit ultimately to the extent of at least \$70,000. Consequently, the plant was located about a quarter of a mile below the Lead mills; and the problems of transportation and of such classification as would permit the pumping-plant to return its former percentage of water to the mills, presented themselves. The latter has been met by the installation of the upper cone-house, where 12 gravity-settling cones, 7 feet in diameter and with 50 degree sides, throw off about half the water and, perhaps, one-fifth the solid matter, which latter is the very finest slime, of the following sizing, during 1902: Coarse, 0; middles, 1.76; fines, 98.24 per cent. The thickened slimes are subsequently, settled out of this pulp, and a part of the water is returned to the mills.

From the bottom of the cones is drawn the thickened pulp, containing all of the leachable material and some of the slimes. This portion is transported by means of a 12-inch cast-iron flanged pipe on a minimum grade of 2.5 per cent., and with as few turns as possible, to the cyanide-plant.

The second step in the classification is carried out in the plant proper by means of 6 more gravity-settling cones, the overflow from which, of a like composition to that of the first 12 cones, is conducted to a collecting-tank, whence it is drawn for the purpose of sluicing out the leachable material after its treatment has been completed. The average size of this second settling-cone overflow for 1902 was: Coarse, 0; middles, 1.38; fines, 98.62 per cent.

The under-flow from the second set of gravity-settling cones, which is now quite thick, passes to 24 sizing, or hydraulic, classifying-cones, which carry a device for discharging the sand and introducing the water, patented by the writer. By its means the admission of water does not result in currents of varying velocity, which latter always interferes with uniform separation of slimes from granular material.

These sizing-cones complete the classification, which has been a difficult problem, first, because of the extreme fineness of the pulp, and, secondly, because the writer was determined to avoid double treatment, which entails a largely increased installation, and operating cost, but which is necessary unless a product be obtained practically free from slime.

The slime-overflow from hydraulic classifiers had the following sizing-average for 1902: Coarse, 0; middles, 1.46; fines, 98.54 per cent. As regards all slimes referred to, they will practically pass the 200-mesh screen, the middles being largely wood-pulp.

In fact, there is little doubt but that the importance of the most perfect classification possible will be recognized shortly as a vital consideration in the cyaniding of wet, crushed ore; and metallurgists will not follow the old German practice of spitzkatsen and spitzlutten, which are very imperfect machines as compared with a cone-classifier or sizer for separating granular from flocculent material. The writer's judgment is that a scientific classification-system, by which

all the granular or angular material may go to the leaching vats, and all the amorphous portion to the slime-plant, will in the future be a feature in designing a plant on which the greatest care and experimentation will be put, and the highest grade of technical skill utilized.

#### CYANIDE-TREATMENT.

By these three steps in the classification we have separated the pulp into non-leachable slimes, comprising about 40 per cent. of the ore crushed, and practically all passing a 200-mesh screen, and a direct-leachable product, amounting to, approximately, 60 per cent. of the tailings, which, although very clean and free from mud, is still of a very fine texture,—as the following sizing-test, the average for the year 1902, will show:

Coarse, remaining on 100-mesh, 40.5 per cent.

Middles, 100- to 200-mesh, 30.8 per cent.

Fines, passing 200-mesh, 28.7 per cent.

While this fineness is notable, we find that, as the proportion of lower-level ore increases, we can treat an even finer product. A recent charge, containing as high as 40 per cent. fines, maintained our normal leaching-rate of 3 to 4 inches per hour through our treatment. This is undoubtedly due to the fact that the fines from the lower-level rock contain a greater proportion of angular or granular, and a smaller proportion of amorphous, hydrated or flocculent, material.

The leachable pulp, which contains 10 to 12 per cent. of pyrite, is now ready to go to the vats; and on the way lime is added in quantities varying from 3 to 5 pounds per ton. At first we tried adding this lime in the mills, as is done in Africa, but found that the amalgamation was most seriously affected thereby; not only was the plate completely coated, weeks being required to get it back in proper shape, but the tailings-values were largely augmented. This result only emphasizes the fact that the process must fit the ore, and that attempts to make an ore fit a process are useless. This practice of adding lime to the battery is, according to the writer's information, unanimously pronounced to work the best results in Africa, and to reduce the values in the slimes lost from amalgamation to half of what they were when no lime is used in the battery. In our case, however, we have demonstrated that the best results follow from crushing the lime wet into a running pulp which joins that from the sizing-cones, whereby there is less slacking and less loss of flocculent lime in the vat overflow, i. e., in the water which overflows the vat, the sand having settled out. Not only is it of distinct advantage to have our lime go into the tank in unslacked granules, but recent investigations are proving that the average size of these granules has an important bearing on the subsequent cyanide-decomposition and gold-extraction. This seems to be due to the fact that a low alkalinity, but one approximately constant throughout the leaching, is an important desideratum with the Homestake ore, on account of its considerable content of easily-decomposed sulphides. We are not as yet, prepared to say what is the very best mesh-screen to use on our lime stamp-battery, but at present we are using a wire-screen, the opening of which is 11-64 sq. in. In this connection it should be said that only the purest lime should be used, the magnesia in the ordinary domestic limestone being objectionable for several reasons.

The classified pulp and the lime having commingled, the mixture passes to the distributor, which is of the garden-sprinkler, or Butters and Mein type.

There are two distributors, one for each row of vats, hung from a carriage, which travels on a track, and the step of which rests on the top of the center-bottom discharge-gate of each vat, when the distributor is in operation. There are 14 vats, each 44 feet in diameter, 9 feet deep inside and holding 610 tons of sand. To fill one of these requires from eleven to eleven and one-half hours, which with our equipment, permits of about five days' contact with solution,



before it is necessary to recharge the vat. After filling, the drain-valve is opened, the top leveled, and the stronger of the two stock-solutions, of a strength of 0.14 of 1 per cent. KCN, is run on. The contact with this solution, including frequent drainages for the purpose of drawing in air, is maintained for about three days. The air-contact is very important in Homestake ores, owing to the presence of pyrrhotite or subsulphide of iron, which absorbs oxygen with great avidity, and which would greatly retard the dissolving action of the cyanide-solution were not large quantities of essential oxygen introduced. The effluent solution during this period, having normally a strength of 0.10 of 1 per cent. of cyanide, is run to the weak precipitation-tanks, of which there are two, each 26 feet in diameter by 19 feet deep, and holding 300 tons of solution.

After the three days' contact with strong solution, the weak solution, normally of a strength of 0.10 per cent KCN, is brought into the charge, and this contact is maintained for the remaining two days. The efficient solution from the charge during this period is run to the strong precipitation or rather collecting-tanks, which are of the same size and number as the weak precipitation-tanks.

Fig. 2 shows the interior arrangement of the works.

After contact with the weak solution has been completed, wash-water is brought into the charge, and the washing continued until the effluent solution is down to 0.03 or 0.02 of 1 per cent. in KCN and from 5 to 7 cents per ton in value.

The charge is now ready for sluicing, which operation is accomplished by two men, with 3-inch hose, in about four hours, using the slime-water from the overflow of the second settling-cones. The four side-gates and one center-gate afford ample facilities for the discharging. The last inch or so of the sand is sluiced with clear water under 75 pounds pressure through 1½-inch hose; and the 8-ounce duck filter, under which is another of cocoa-matting, is washed clean. The vat is then filled with water, and is ready for the next charging.

Precipitation—As stated above, the effluent solution resulting from the leaching with strong solution is run to the weak precipitation-tanks, and has a value of, approximately, \$2 per ton and a strength of 0.10 per cent. KCN. When one of these weak precipitation-tanks is full, the stream is turned to the other, and the former is then ready for precipitation. It contains 300 tons of solution, which is brought into agitation by means of compressed air, and about 60 pounds of zinc-powder, in the form of an emulsion, is sprayed in during the agitation. The pump, which is of the compound, duplex, outside-packed, plunger-type, is then started, and the mixture pumped through two large filter-presses 36 inches square, of the flush-plate and distance-frame pattern, containing 24 frames, each 4 inches in depth.

While the gold, silver and excess of zinc remain in the frame and on the cloth, the barren solution passes through the cloth and on to the weak solution storage-tank below (of the same size as the sand vats), whence it passes again to the sand as weak solution. Its value has been reduced by this operation from \$2 to 5 or 10 cents per ton, being a precipitation of 95 to 97.5 per cent. The efficiency of this method lies largely in the fact that the cloths of the presses are coated with about ¼ inch of powdered zinc and precipitate, so that every particle of solution, having to pass through the cloths, gets a molecular contact with the fine zinc, which is true of no other precipitation-process. The presses are run without opening for a month, at the end of which the press-gauges indicate about 16 pounds pressure, notwithstanding the fact that they then contain about a ton of precipitate, worth, say, \$50,000, when they are cleaned up by two men in about six hours, including the putting together with new cloths. Figures covering the labor of cleaning up \$50,000 from zinc boxes and from electrolytic precipitation would form an interesting comparison.

We will now return to the effluent solution, resulting from the contact of the tailings with weak solution during the latter part of the leaching. This is run to the strong-solution collecting-vats. When these are filled, they are strengthened to 0.14 per cent. KCN and pumped directly, without precipitation, to the strong-solution storage-tank, of the same capacity as the weak storage, whence it goes on to the early treatment of the charge, as before mentioned. Its value is from 30 to 50 cents per ton. It will thus be seen that the strong solution of one day becomes the weak solution of the next day, and that the values are all accumulated in the weak precipitation-tanks. The strong solution thus has an approximately constant value, that is to say, only one-half of the total effluent solution is precipitated, the other half being of a constant low value.

**Refining Precipitates.**—As the refining of cyanide precipitates is of some importance, owing to the well-recognized losses taking place in the ordinary methods, which are from 2 to 6 per cent., a description of the process we use at the Homestake, in which the loss is less than 0.1 per cent., may be of interest.

The precipitate, after removal from the presses, is treated first with dilute hydrochloric acid in a lead-lined mixing-tank, equipped with a mechanical agitator, a hood and a powerful exhaust-fan. After agitation and settling, the supernatant liquid is forced through a filter-press by air-pressure. Sulphuric acid is then added, agitation begun, and the mixture heated. It is then settled, and the supernatant solution put through the press, as in the case of the hydrochloric acid. Wash-water is then added to the mixing-tank and the whole mixture put into the press, where it is further washed. The aggregate value of the acid-liquors and wash-water flowing from the press is less than \$20 from \$50,000 worth of precipitate. A portion of this value is recovered from a large settling-tank, into which the effluent solutions flow, and the remainder constitutes the only loss we have been able to find in this process of refining.

The resultant, acid-treated precipitate is then removed to a large steam-dryer, where a part of the moisture is expelled, but never all, and the precipitate mixed with litharge, borax, silica and powdered-coke. When thoroughly mixed, it is sprinkled with a solution of lead-acetate and the whole mass briquetted under a pressure of 4,000 to 6,000 pounds per square inch. The zinc having been removed, and the briquettes having been dried, a borax-slag develops upon the outer surface upon being charged to the cupel, and they fuse quietly, quickly and at a low heat, without dust or volatilization-losses. The lead absorbs the values, sinking to the bottom, and the slag is tapped off. All the slag having been removed, the lead is cupelled off as litharge, and the resultant metal, 975 to 985 fine, is ready to run into bars. The cupel-slag and the cupel-bottom are then put through the blast-furnace, the lead-content of the slag reduces to lead, which absorbs the values, and is drawn from the lead-well in the usual manner. This lead is returned to the cupel at the next clean-up, the litharge from the cupellation goes to the next precipitate, and the blast-furnace slag is worth less than \$5 per ton.\*

The total cost of this refining amounts to less than  $\frac{3}{4}$  of 1 per cent.; so that the Homestake Company realizes \$20.52 per ounce for its cyanide-gold, less the usual U. S. Assay Office charge on dore bullion, and the expressage to New York. These charges amount to between 10 and 11 cents; and the net realization per ounce of fine gold precipitated is thus \$20.42 in New York exchange. A parting-plant is now contemplated, which will make a further saving in this connection and enable the company to turn out fine gold and fine silver.

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\* The writer has applied for patents covering this process, which was first carried out experimentally during the latter part of the year 1900.



## TONNAGE, PERCENTAGE AND COSTS.

**Tonnage.**—The maximum monthly tonnage of this plant—which is ascertained by placing cubic-foot boxes in many parts of various vats, determining the dry-weights per cubic foot of sand and averaging a large number of such determinations—was attained in October, 1902, when 40,236 tons, or 1,298 tons per day, were treated.† This gives to the Homestake Company the largest sand-treatment cyanide-plant in the world; the next largest being, to the best of my knowledge, that of Simmer & Jack in South Africa.

**Percentage.**—As a comparison of the various assay-determinations and valuations with the bullion produced is always of interest, the following figures for the last half of the year 1902 are given:

**Extraction.**—The extraction, as shown by the difference between charge and residue-assay multiplied by the tonnage, was \$292,579.

**Precipitation.**—The precipitation, as shown by the difference between assays of unprecipitated and precipitated solutions multiplied by the solution-tonnage, was \$301,233.

**Gold in Precipitates.**—The amount of gold in precipitates, that is, the assay-value of the precipitate sampled upon removal from the presses, was \$302,895; the gold-value of bullion shipped, \$307,635, and the silver-value, \$2,874.

The average percentage recovered in bullion by the treatment for these six months is 74.7 per cent.

This is not as high a percentage of bullion as should be recovered from a porous or oxidized ore, or one in which the values are along cleavage-planes; but, in view of the fact that such a high percentage is recovered by amalgamation, that the values are very finely disseminated in the Homestake ore, and that the tailings are very low-grade, we feel, and all our tests so far have verified our conclusions, that it is the economic percentage, yielding the maximum net profit.

Many tests and experimental runs of the plant, looking toward a greater net yield, have been made, covering longer treatment (stronger and weaker solutions, extra oxidation with sodium and barium dioxide, and other similar reagents, varying algalinities and alkaline reagents, etc. The question of separate treatment of concentrates and coarse sands has also been investigated, all with negative results. The conclusion of the writer in regard to this latter point is that, even if a higher net yield could be realized by separate treatment, which is contrary to the results of all our tests, a much greater proportion of the fines (passing 200-mesh screen) would have to be thrown off and wasted entailing a serious net loss.

**Costs.**—As to operating costs at the Lead cyanide-plant, the following are the averages per ton for the year 1902, during which the average value of the material treated was \$1.65 per ton:

Classification—Labor and Supplies .....\$0.017

Treatment:

Cyanide .....	\$0.152
Labor .....	0.030
Lime .....	0.022
Supplies .....	0.005

\$0.209 0.209

Precipitation—Labor and Supplies ..... 0.026

Power—Labor and Supplies ..... 0.051

Water ..... 0.026

Assaying—Labor and Supplies ..... 0.013

Refining—Labor and Supplies ..... 0.006

Miscellaneous ..... 0.005

Total .....\$0.353

† Since this paper was written, another step in the classifying of the pulp has been added, with the result that this plant is now treating approximately 1450 tons per 24 hours.

As compared with the above, the lowest cost I have seen authoritatively stated for other plants are as follows:

City and Suburban South Africa .....	\$0.55
Geldenhuis Estate, South Africa .....	0.605
Geldenhuis Deep, South Africa .....	0.62
Robinson, South Africa .....	0.62
Worcester, South Africa .....	0.72

The African costs refer, of course, to operations before the late war between England and the South African Republic; but they are the only figures available to me, and I do not think they have been reduced materially since.

As regards the Homestake slimes, which are not at present being treated, their assay-value ranges from \$0.80 to \$1.10 per ton, which is very much lower than that of any slimes now being cyanided elsewhere, and which does not offer much inducement to undertake their hydrometallurgical treatment as a whole. It is the writer's judgment, however, that a material profit, greater than that attainable by any other method of treating the whole bulk of slimes, may be recovered by concentrating these slimes and cyaniding the concentrates so obtained; and experiments on a working scale will shortly be undertaken along these lines.

MR. RUSSELL, OF NORTH DAKOTA: Mr. President, I rise, sir, to make a motion which I trust will meet with the approval of the Congress. We have listened yesterday to the secretary of the treasury of the United States; we have listened today to the director of the mint. Both of those positions have from the foundation of the government filled a post most important in the administration of the country. We have listened this afternoon to a statement from another member of the administration, one of the bureaus, telling us of the remarkable display that the nation is to make at the St. Louis Exposition, which, I presume, will be, Mr. President, one of the largest and finest expositions that has ever been held in the world. Those expositions, I believe, took their origin in the Crystal Palace of London nearly fifty years ago. Now that the United States are to hold another exposition at St. Louis next year which, I presume, will be the largest that has ever been held. There is to be prepared then an exhibition of coal, which mineral, as we have heard from the paper this afternoon, is the foundation for the power that works the great industry of the country. I move you, therefore, Mr. President, that a rising vote of thanks be presented to Mr. Parker for the able paper he has given to us and the thanks to him and his colleagues and others that are working for the preparation that is being made for the exhibit at St. Louis.

Which motion was duly seconded and stated by the president and unanimously carried.

PRESIDENT RICHARDS: The next subject on the program for this afternoon is by Dr. C. C. O'Harra, of Rapid City, South Dakota, on "The Geology and Mineralogy of the Black Hills."

MR. LYNCH, OF MONTANA: Mr. President, inasmuch as complimentary votes have been in order, all of which is certainly proper, I move you at this time that we extend a vote of thanks to Mr. C. W. Merrill, who has just read this very able paper on the treatment of Homestake ores in this state and I move you that the same be made by rising vote.

The motion was duly seconded by Mr. Conzette, of South Dakota and on being stated by the president was unanimously carried by rising vote.

PRESIDENT RICHARDS: We will now listen to the paper by Mr. O'Harra.



## THE GEOLOGY AND MINERALOGY OF THE BLACK HILLS REGION.

By Cleophas C. O'Harra, South Dakota School of Mines, Rapid City, South Dakota.

The Black Hills region is in many respects a typical geological unit. It lies within the forks of the Cheyenne river on the South Dakota-Wyoming boundary line, a much larger portion of the area being within the state of South Dakota. Separated from the Rocky Mountains to the west and southwest by a distance of less than 150 miles the region possesses many of the lithologic and physiographic features of the great mountain system. Structurally the region is an elliptical outwardly dipping uplift, the more distinct features of which cover an area about 100 miles long and 50 miles wide, the longer axis approximately coinciding with the meridian except in the northern portion where the general direction is to the northwest. By reason of its isolated position, its simple structural features and the many excellent natural and artificial rock exposures the history of the region may be interpreted with a considerable degree of ease.

The general system of drainage is distinctly radial, this being due to the domestic nature of the uplift. The two enclosing arms of the Cheyenne river wholly isolate the Hills from other systems of drainage and receive the many smaller streams from the more elevated portions of the uplift, a high western limestone plateau being the main divide. In certain places the rapid erosion of softer beds has modified this general radial arrangement, a notable example being in the formation of the well known Red Valley, which forms a nearly continuous encircling depression separating the higher central portions from the distinct but less elevated Cretaceous hog-back ridges of the foot hills. The more important streams continue actively cutting their beds. Each lithologic unit with its particular and sometimes striking color yields distinctive topographic forms dependent upon relative capacity for resisting erosion, the result being that in many places features of rare interest are produced. The Harney Peak area of the Southern Hills with its bold pinnacles and walls of coarse bare granite rising from their forest-clad base of metamorphic rocks presents a beautiful panorama, while the steep walled canyons of Spearfish Creek in the northern part of the Hills and of Elk creek in the northeastern part are among the most picturesque that America can show. Again to the northwest in Wyoming where the horizontal sandstones and shales have been intricately carved by the various streams and where the brilliant and varied colors of the several formations harmoniously blend with a wealth of forest and pasture overlooked here and there by the stately, somber forms of porphyry buttes there is presented a view well worth many a hardship to see.

The prominent topographic features are a high central basin of granite and metamorphic rocks of Algonkian age, surrounded in a concentric manner by a rugged infacing escarpment of massive white Carboniferous limestone, a wide depression in the red Triassic shales and a high view of Cretaceous hog-back ridges or foot hills. Beyond these are the later Cretaceous shale formations which give rise to the gently undulating plains. Farther away on almost every side, interrupting the otherwise monotonous approach to the Hills there are abrupt tables and buttes of Tertiary clays, large portions of which have been carved into forms that bewilder the imagination of the most fanciful observer. In the northern Hills Tertiary intrusive rocks have greatly modified the general topography and in not a few instances have formed prominent landmarks. Terry peak, situated near the center of activity of intrusions, in the highest point. It reaches an altitude of 7,069 feet. A few miles west of this is the Bear Lodge range, which culminates in Warren Peaks, making a subordinate but important center of Tertiary disturbance. the highest point being more than 6,650 feet above sea level. Several

isolated igneous peaks differing in petrographic and structural nature only in a varietal way form the prominent peaks of the more intricately disturbed districts already mentioned, stand as tall sentinels among the lower peripheral ridges. Chief among these are Bear Butte, Crow Peak, Black Buttes, Inyan Kara, the Missouri Buttes and the justly famed Devil's Tower. The highest point within the entire Black Hills region is Harney Peak. This is the culminating peak of the Harney granite range in the southern Hills. It reaches a height of 7,216 feet. The surrounding limestone escarpment rises high above much of the central portion and considerable areas of the plateau along the western side closely approach the height of Harney Peak. The mean altitude of the plains surrounding the Hills is little more than 3,000 feet. The average elevation within the hog-back ridges is approximately 5,000 feet.

The rocks of the Black Hills show a wide range in age and character. Within the crystalline nucleus are pre-Cambrian granites, amphibolites, schists, slates, phyllites, and quartzites. Beyond this nucleus are limestones, sandstones, shales, and conglomerates representing a nearly complete sequence from Cambrian to Laramie. Their combined thickness is approximately 10,000 feet. Extensive overlaps of Tertiary rocks are also present while Pleistocene deposits of various kinds occur widely distributed over the surface of the region. Silurian rocks are found in a few localities but are of little importance. In the northern Hills there are porphyritic rocks in great profusion. Phonolites, Rhyolites, Gneisses, Andesites, Dacites, Diorites and Lamprophyres are found and their recent careful study has aroused much interest among petrographers. To the prospector and miner they are of interest in that their intrusion has greatly influenced mineralization and the nature and distribution of the igneous masses have to no little extent been the determining factor in the occurrence of ore bodies. Fossiliferous beds are common among the foot hills while only a short distance to the southeast are the world-renowned White River bad lands with their wealth of vertebrate remains.

The sedimentary deposits which were laid down subsequent to the upturning and metamorphism of the Algonkian rocks have had their various characters properly defined by recent study, the determined formational units receiving appropriate individual names. The formations with their chief characters, exclusive of the Tertiary and the Pleistocene deposits, are as follows:

Generalized section in the Black Hills region, showing formation, character, average thickness in feet, and the age:

Laramie, massive sandstone and shale, 2,500 feet, Cretaceous.

Fox Hills, sandstone and shale, 250—500 feet, Cretaceous.

Pierre shale, dark-gray shale, 1,200 feet, Cretaceous.

Niobrara, chalk and calcareous shale 100—300 feet, Cretaceous.

Benton Group:—

Carlile formation, gray shales with thin sandstones, limestones, and concretionary layers, 500—750 feet, Cretaceous.

Greenhorn limestone, impure slabby limestone, 50 feet, Cretaceous.

Graneros shale, dark shale with lenses of massive sandstone in its lower part at some places, 900 feet, Cretaceous.

Dakota sandstone, massive buff sandstone, 35—150 feet, Cretaceous.

Fuson, very fine-grained sandstone and massive shale. White to pure color, 30—100 feet, Cretaceous.

Minnewasta limestone, gray limestone, 0—30 feet, Cretaceous.

Lakota, massive buff sandstone, with some intercolated shale, 40—350, Cretaceous.

Beulah shale, pale grayish-green shale, 0—150, Jurassic.

Unkpapa sandstone, massive sandstone: white, purple, red, buff, 0—250, Jurassic.

Sundance, dark-drab shales and buff sandstones; massive red sandstone at base, 60—400 feet, Jurassic.

Spearfish, red sandy shales with gypsum bed, 250—500 feet, Triassic.



Opeche, red slabby sandstone and sandy shale, 90—130 feet, Permian?

Minnelusa, sandstone, mainly buff and red; in greater part calcareous. Some thin limestone included, 400—600 feet, Carboniferous.

Pahasapa limestone, massive gray limestone, 200—800 feet, Carboniferous.

Englewood limestone, pink slabby limestone, 25 feet, Carboniferous.

Deadwood, red-brown quartzite and sandstone, locally conglomeratic, partly massive, 4—400 feet, Cambrian.

The oldest rocks of the region are the slates, schists and quartzites. They constitute the main central area of the Hills. Their dip approximates the vertical while their strike corresponds fairly well in a general way with the meridian line. The quartzites are usually less easily eroded than the slates and schists, in consequence of which they not infrequently stand out with much prominence. This has unconsciously led many to erroneously designate them as dikes. Dark, basic, schistose igneous bands occur in many places with the metamorphic sedimentaries, their general occurrence being such as to give the impression of intercolation conformable to the original bedding. These rocks have not received careful study but they may be provisionally grouped under the name "amphibolites." They are commonly designated by the prospector as diorite or hornblende rock. Intimately associated with all of these are the granites of the southern and central Hills. In the northwestern part of the Hills on the South Dakota-Wyoming line another small but important area of granite is found. A distinct characteristic of nearly all this granite is its extremely coarse texture. Its feldspar quartz and mica and even the less important and non-essential constituents may be frequently found in isolated crystalline masses of unprecedented size. The rocks come under the variety of granites designated as pegmatite and as usual with pegmatite carries an abundance of rare useful minerals.

Following the granites which are later than the amphibolites but still of Algonkian age there were no igneous intrusions until the Tertiary. Then approximately coincident with the general uplift of the Black Hills region came the igneous bodies so abundant in the northern Hills. These for want of a better collective term are commonly designated as porphyries. They are generally, although not always, of a distinctly porphyritic nature, the large crystals being quartz, or more frequently some form of feldspar or occasionally hornblende or biotite, etc. To mention all the localities where these may be found would be for the present occasion a tiresome task. The following important mountains must suffice: Terry Peak, Bald Mountain, Elk Mountain, Ragged Top, Devil's Tower, Custer Peak, Bear Butte, Crow Peak, Inyan Kara, Sundance Mountain and Warren Peaks. Less prominent masses occur in great profusion and few important gulches of the region are free from good exposures, the structural details of which may frequently be determined with much precision. The intrusives occur in the form of dikes, shocks, sills and laccoliths, few regions showing them in greater number or to better advantage. Intermediate and connecting stages of every grade are found and erosion has planed and dissected them so carefully that the faithful observer may easily read their meaning.

Reviewing and collecting foregoing facts with reference to the sequence of occurrence of the many phenomena it may be said that in Algonkian time the schists and quartzites were deposited as sediments derived from land lying apparently either to the west or to the northeast of the position now occupied by the Hills. Later these original sediments were penetrated by basic eruptives, at which time more or less metamorphism and folding were produced. Subsequent to this action the sedimentary rocks, as well as the basic eruptives, were ramified by quartz veins, many of which are gold-bearing. Following the eruption of the basic

rocks, and after most or all of the gold-bearing quartz veins were formed, extensive granite intrusions occurred. Apparently at the time of the intrusion of the basic eruptives the slaty cleavage was produced, and approximately coincident with the granite intrusions the crystalline schists were developed. At some time during the middle or latter part of the Algonkian period the sea shallowed and the land rising above the sea as an island, reached a considerable height. The rocks thus brought under the influence of erosive agents supplied much or all of the sediments which make up the Cambrian strata.

Little is known of the conditions during Silurian and Devonian time, rocks of these periods being absent in the southern portion of the uplift and very scantily represented in the northern portion. Deep water prevailed during the early part of the Carboniferous period, and although the sea subsequently shallowed, apparently little or no land area existed near the region until after the period closed. The Triassic red beds, with their included widely distributed lenses of gypsum, followed the extensive deposition of the nearly pure Permian limestone, indicate a considerable uplift and general shallowing of the sea. The shales, sandstones and impure limestones of the Jurassic show considerable oscillation and, on the whole, further shallowing of the sea. The Cretaceous rocks, including as they do a great series of diversified strata, represent several changes of conditions. In general it may be said that fairly shallow seas existed in the early and later portions of the period, while during much of the intervening time deep water prevailed.

Near the beginning of Tertiary time great disturbances took place. The region was lifted quite above the sea and deeply trenched by outflowing streams. Sea conditions disappeared, leaving the land partially or wholly surrounded by a considerable body of water in the form of a lake. Approximately coincident with these changes the Tertiary igneous rocks of the northern Hills were intruded among the sedimentaries, and by their subsequent denudation and degradation added their portion of sediment to the surrounding lake. The lake then disappeared and upon its dry bed the modern streams have trenched their way.

It is unnecessary to say that the unravelling of all these facts is a matter of much interest to one desirous of knowing the processes of nature's activities, and the knowledge gained by the study of the relation of these facts to ore and mineral deposition is one to which much fruitful study might be given. The Black Hills region ranks among the important mineral producers of the country and well it may. Among the ores and minerals already productive or capable of production the following are of importance: Gold, copper, iron, manganese, silver and lead, tin, tungsten, graphite, mica, Spodumene, building stone, brick clays, cements, coal. Of all these gold is pre-eminently the chief product. Its presence may be detected in almost every variety of rock within the region and workable bodies are found at many horizons. The following classification gives the various horizons and indicates to a certain extent the mode of occurrence of the ores:

Classification of Black Hills gold ores:

- A. Ores occurring with the Algonkian rocks
  - 1. In quartz veins.
  - 2. In veins of auriferous pyrite.
  - 3. In igneous dikes, sheets, etc.
  - 4. In slate breccias.
  - 5. In fissure veins.
  - 6. In mineralized zones.
- B. Ores occurring within the Cambrian rocks.
  - 7. In the basal conglomerate—"cement" ores.
  - 8. In slates, sandstones and quartzites—"siliceous" ores.
- C. Ores occurring within the Carboniferous rocks.
  - 9. In brecciated "verticals" in limestones—"siliceous" ores.



10. In massive limestone—"lime-siliceous" ores.
- D. Ores within the Pleistocene deposits.
  11. In high level bars—"dry" placers.
  12. In present strata beds—"wet" placers.

Of these deposits the placers, the cement ores, and the brecciated limestone verticals early yielded their most profitable returns, the pyrite veins have been extensively exploited only as a source of fluxing material for smelting operations while the igneous dikes, sheets, and slate breccias, although known to be of occasional importance, have not received thorough attention.

The gold-bearing quartz veins are found throughout the highly metamorphic area of the Hills, Custer, Pennington and Lawrence counties all showing localities yielding handsome values. This ore is generally free milling but there are important exceptions, the difficult treatment of which has to the present time prevented successful development.

The siliceous and the lime-siliceous ores, as they are called, which are so extensive in the northern Hills are wholly refractory. They occur in the form of shoots or channels within the nearly flat lying sedimentaries known as the blanket formations in immediate connection with nearly vertical fractures running in a direction parallel to the longer diameter of the shoots. The fractures or "verticals," as they are frequently called, are generally slickensided and frequently form vault planes along which more or less movement has occurred. The ore shoots vary considerably in shape but in the main are greatly elongated bodies having a rounded or lenticular cross-section. They lie in a general north-south direction and excepting certain irregularities produced by lateral branches are practically parallel with each other. The structural relations are occasionally complex. Folding is observed, faulting frequently occurs and the igneous intrusions sometimes aid in concealing true stratigraphic relations. Usually, however, the conditions are of such a nature as to cause no serious hindrance to the proper development of mining property. The siliceous ores are found at various horizons within the Cambrian, chief of which is immediately above the conglomeratic quartzite. The lime-siliceous ores, so called, occur at various horizons within the Carboniferous, the chief position being near the top of the massive white or gray limestone now technically known as the Pohasappa formation. Tertiary igneous rocks have cut and intercalated the Cambrian and Carboniferous strata to a marked degree and it is to this action either directly or indirectly that the deposition of the ore is due.

Of all the classes of ores mentioned that of the impregnated zones has longest yielded large returns. The typical zone, the Homestake belt, has furnished approximately three-fourths of the total gold output of the Hills and continues today to afford more than one-half the annual output. The ore occurs in extensive deposits, chiefly as low grade chloritic and amphibole schists highly impregnated with quartz and is largely free milling.

Of mineral products in the Hills other than gold copper, iron, manganese and tin have received much attention but as yet no properties worked for them have become steadily productive. Copper is found chiefly in the Algonkian and nearly every portion of the Hills conrial metamorphic rocks disclose its presence. Many of the properties are capped by a heavy gossan carrying more or less copper and in various places where this gossan cap discloses considerable quantities of copper extensive prospecting is being carried on. As usual with such deposits carbonates oxides, and the native metal are found near the surface, while below sulphides occur. A zone of enrichment which judging from other regions showing apparently similar conditions might be confidently expected has not yet been disclosed. Only future extensive prospecting under favorable conditions will prove conclusively the actual nature of the deposits.

Iron is widely distributed within the slates and schists and in the southern and central Hills it has received some attention. Distance from ready markets has thus far prevented its extensive exploitation.

Silver and lead are found in the Algonkian metamorphic rocks and in the Cambrian and Carboniferous sedimentaries. Lead ores associated with silver have been mined in the central Hills and at Carbonate and Galena. The character of the ore bodies in the various localities differ widely. They occur in the Algonkian in veins, in the Cambrian as shoots and in the Carboniferous as contact deposits, the latter two graduating more or less into each other. In the central Hills the ore is closely associated with vein quartz. At Iron Hill is occupied a nearly vertical position along a porphyry dike where it cut the massive Pohasappa limestone. At Galena the ore bodies are found in the Cambrian, their manner of occurrence being much the same as the Cambrian siliceous gold ores. They, like the gold ores, are impregnations due to secretions from water which has gained access to the easily replaceable calcareous materials through numerous vertical cracks or fissures produced perhaps approximately coincident with the intrusions of the Tertiary igneous rocks.

Tin is found in the granites and in the stream gravels of the Harney Peak and the Nigger Hill districts. The ore occurs in the form of cassiterite. Cupro-cassiterite occurs at the Etta mine near Keystone and stannite has been identified, but these last aside from their scientific interest are of no value as thus far disclosed in the region. The cassiterite is found in the granite or crystals or masses of all sizes up to occasionally several pounds weight. The minerals occur chiefly in a feldspar or muscorite aggregate but is occasionally found in a quartz muscorite aggregation in quartz alone. The granite is of a distinctly pegmatitic character and where the tin occurs is in the nature of dike material. The wide distribution of the cassiterite is readily conceded but the actual value of the deposits is a much discussed problem, the nature and details of which have been so often touched upon that there is no need at this time to offer opinions upon the subject.

Wolframite or Tuysten as it is frequently called is one of the most recent minerals to enter the list of Black Hills metallic products. This has been long recognized in small amounts in the granites of Custer and Pennington counties, but four years ago it was observed in quantity in Lawrence county, closely associated with the Cambrian siliceous gold ores. The chief occurrences are near Lead and Yellow creek.

This extremely brief review of the metallic minerals brings us to the nonmetallic products. These are of great interest and they could readily lend themselves to extended discussion. Publications now readily accessible describe these in detail however, and they need receive little more than enumeration at this time. Graphite occurs in the slate and schists in quantity but as yet of uncertain value. Mica in the Harney Peak granite has long been worked and still receives prominent attention. Spodumene, also from the Harney Peak granite, especially near Keystone, is extensively worked for its lithia content. It is well to state and of interest to remember that this mineral occurs in crystals of unprecedented size, no other place in the world so far as known showing crystals of any substance comparable in size to the spodument crystals of the Keystone district.

Building stone is abundant. Few of the geological formations are wholly lacking in minerals fairly suitable for building purposes and several of them can supply good stone in unlimited quantity. Thus far the Dakota, the Lakota and the Unkpapa sandstones have received most attention. They are readily accessible, are durable, and are otherwise suitable for structural purposes. Brick clays and cements are abundant and easily secured. Coal is found in



the lower part of the Lakota along the western and northwestern edge of the Hills in Wyoming, it having been mined for several years near Newcastle and at Aladdin.

This briefly and inadequately is a summary of the geology and mineralogy of the Black Hills. In concluding my paper I would add testimony to that of many another before me that the Black Hills region is truly a land of wealth and beauty a most interesting part of nature's great store house where men may seek with profit the material necessities of life and where they may not find lacking those things which gratify the mental nature and which tend to lead to nobler living.

**PRESIDENT RICHARDS:** This closes the exercises of the afternoon as provided by your program committee. What is your further pleasure?

**MR. JACKSON, OF IDAHO:** Mr. President, I have a resolution here that I should like to have read and referred to the committee on resolutions, being a resolution entitled, "A Resolution as to Mineralized Timber Lands."

The resolution was read by the secretary and by the president referred to the committee on resolutions.

**MR. MOORE, OF SOUTH DAKOTA:** Mr. President, I move you that by rising vote we extend Professor O'Harra a vote of thanks for his highly interesting and instructive paper upon the geology and mineralogy of the Black Hills.

The motion was duly seconded, stated by the president and unanimously carried.

**PRESIDENT RICHARDS:** The secretary will read another resolution by Mr. James W. Abbott, of Colorado, which, when read, will be referred to the committee on resolutions.

**COLONEL THORNBY, OF SOUTH DAKOTA:** Mr. President, I move that this Congress extend its thanks to Mr. Blatchford for his very excellent paper, by rising vote.

The motion was duly seconded, stated by the president and unanimously carried.

**MR. C. L. DIGNOWITY, OF PENNSYLVANIA:** Mr. President, I desire to offer a resolution with reference to the appointment of a committee of five of our active members, to be selected by our chair, to derive means by which suitable men be employed to visit all mining camps and organize local mining organizations to cooperate with this congress in obtaining paid members.

The resolution was read by Secretary Mahon and by the president referred to the Committee on Resolutions.

The Chairman of the Program Committee, Mr. Elder, of South Dakota, announced the program for tomorrow, September 10, 1903.

**MR. C. L. DIGNOWITY, OF PENNSYLVANIA:** Mr. President, in presenting my resolution which was turned over to the committee, I was going to ask them to waive that and allow the chair to appoint that committee in order to expedite matters; some of the members are going away and we would like to have some of those members here to help us out. I feel as though our President has presented us with such an earnest request to attend to these matters that we ought to take heed and hurry the matter along.

**PRESIDENT RICHARDS:** How soon did you say you would like that committee appointed?

**MR. C. L. DIGNOWITY:** I would like to have the chair appoint that committee, if it is in accord with the wishes of the Congress, now and not wait to refer it to the Committee.

PRESIDENT RICHARDS: I would like a little time to think over the matter because we would require men of special fitness for that work, and I would like to have some suggestions from others. I could possibly announce the committee Friday morning so that we could get men of qualification to serve on that committee, it is not everyone that can serve.

It was moved and seconded that the chair appoint such committee and that he report the membership of such committee at the Friday meeting.

PRESIDENT RICHARDS: If there is no objection to that motion we will consider it carried and the chair will so appoint and announce.

MR. TARBELL, OF COLORADO: I move that we adjourn until 8 o'clock this evening.

The motion was duly seconded and upon being stated by the President was carried and the Congress adjourned to 8 o'clock P. M., to meet at the Golden Star Club, of Lead, South Dakota.

Lead, South Dakota, September 9, 1903, 8 P. M.

PRESIDENT RICHARDS: Congress will be in order. We have on our program an address by the Honorable John L. Webster, of Omaha, Nebraska, his subject being "The Money Metals and Their Influence Upon Civilization."

HON. JOHN L. WEBSTER: "Money, which represents the prose of life, and which is hardly spoken of in parlors without an apology, is in its effects and laws as beautiful as roses." So said the American philosophical seer of a generation ago; Ralph Waldo Emerson. It has been said that the love of money is the root of all evil. But one who has deeply studied the history of civilization, and whose writings are recognized as standard everywhere, Henry Thomas Buckle, said that "after the love of knowledge there is no one passion which has done so much good to mankind as the love of money."

Wealth is power. Gold is the standard of its measurement. Comforts and luxuries are its attendants; supremacy in trade and commerce its achievement. Wherever there is found a wealthy nation, there is progress and advancement. Such is the United States with her ninety-four billions of wealth, and countless gold in her treasury. One of her chief sources of security is the money metals buried in her mountains, which the energy and toil of her industrious and venturesome men are daily bringing forth, to enrich the people and to make possible further resulting achievements for the betterment of mankind.

Gold discoveries are the advance guard of civilization. They are attended by phenomenal tides of emigration. Multitudes of people of all classes and all languages, in all countries and in all ages, have left their old homes and wandered, amid hardships and dangers, over lands and over seas to the uttermost parts of the earth where the money metals have been found. In their zeal, when necessary, the sword has made the roadway against resisting forces. They have carried on devastating and merciless wars against ignorant and semi-barbarous people, dignified by historians under the name of conquests.

Cortez and Pizarro were typical leaders of such destroying forces, but the gold of Mexico and Peru brought back life to decaying southern Europe, and opened the way for the outgoing of one race and the incoming of another; for the new peopling of a hemisphere that had existed from the beginning of time in the darkness of world isolation.

But after all—no matter how cruel the means or destroying the process, or destructive the forces—the old race of people gave place to the invader, and a new civilization spread over the land and over the new continent; in North America an Anglo Saxon civilization, "making the deserts and waste places to blossom, cities to rise amid the solitude, and seas whose virgin waters had hardly been stirred by a single prow, to grow white with the sails of golden argosies."



To us, as citizens of the United States, the discovery of gold in California presents a more interesting series of social and political events and more wonderful material and industrial changes. In the colonial period of our history, the money metals were scarce. The cheap and bulky and inconvenient devices at times resorted to to represent money made trade difficult and commerce almost impossible. It seems surprising to us now, but was not strange then, that such statesmen as Edmund Randolph, James Madison and John Dickinson suggested to the Federal Convention in 1787 to insert a clause in the Constitution to measure the salaries of the President and Senators by the value of so many bushels of wheat. From that period to the discovery of gold in California in 1847, a period of sixty years, the aggregate output of gold in the United States was limited to \$24,000,000, and the growth of the population from about five to twenty millions.

From Jamestown and Plymouth to 1847—from the Atlantic seaboard to the Missouri River—marked the limit of the progress of our people through a period covering more than two centuries of time. After 1847, when Marshall had discovered the glittering dust in the raceway of Sutter's mill—when gold began to be turned up like clods of earth or washed from sands deposited by mountain torrents—civilization began to sweep over the plains, the Rockies, the Sierras and down the valley of the Sacramento to the sea. Soon the Californians boasted while they were taking out \$40,000,000 of gold in 1849 and \$65,000,000 in 1853, that her valleys laughed with fertility; that culture climbed her mountains; and that the commerce of the world was represented in her harbors. On, and on, went the changes until each rising sun now greets the faces of 20,000,000 of people west of the Missouri River; a prosperous and happy and industrial people; with farms and villages and towns and cities; with schools and colleges and universities; with museums of art, and evidences of refinement everywhere; an Empire that has moved the center of the country's social, commercial and political gravity many degrees westward, and presents untold possibilities for the future.

The immense gold output of California soon stimulated thousands of prospectors and adventurers to search the whole region of mountains extending from Mexico to the Canadian line for the precious money metals. Soon gold was discovered in Colorado and silver in Nevada. Pikes Peak and Virginia City became names as familiar as New York and Boston.

Then the mountains of Utah disclosed gold and silver, and Montana was added in the sixties with her gold and copper. The cities of Salt Lake and Butte and Helena became familiar as the homes of mining kings, and San Francisco the city where they built their palaces. But the daring spirits of men were not yet tired, and the Black Hills were explored—this group of mountains standing out alone, as if nature buried within them her richest treasures and then heaved them up above the plain to attract the attention of men—and here were found the out-croppings of millions upon millions of tons of gold ores. Now Deadwood and Lead are as well known to the country as St. Louis and Philadelphia.

From all these gold fields, from 1847 to 1903, the aggregate of the output of the money metals reached such momentous proportions that it surpassed the understanding and comprehension of men. Those sixty years have witnessed important movements, oft forgotten but which need only be suggested to be remembered, and which changed the social and political character of the Nation.

The gold hunters and that vast throng of sturdy pioneers who peopled the western coast were men who had endured indescribable hardships as they slowly journeyed through the almost impassable fastnesses and frowning canyons of the Rockies. They breathed the air of freedom from the mountains and were inspired by the ever restless waters of the Pacific as an emblem of liberty. These men believed that slavery and nature were at war, and in 1850 brought

California into the Union as a free state. The equilibrium between the North and the South, between the free states and the slave states, which the southern statesmen had so long endeavored to preserve was thus forever broken.

Then followed a chain of resulting circumstances, in every link of which may be seen evidences of forces which the searchers for the money metals had directly or indirectly put in motion, and which coupled with American high ideals of citizenship worked out wonderful results for the betterment of humanity and the strengthening of the Union.

With slavery forbidden within the confines of California, its lodgment anywhere along the Pacific coast line became an impossibility. There soon followed the Southern agitation for an extension or enlargement of slave territory, and the repeal of the Missouri Compromise. The North and the South threw down the gauntlet and fought a political duel for the possession of Kansas. The lovers of manhood rights, from New England to the mining camps of the West, joined hands in the struggle. Higher ideals of citizenship again prevailed and another free state was added to the Union.

The political strife now assumed national proportions. The Democratic Convention at Charleston witnessed the wrecking of that party over the slavery question and which split it asunder on sectional lines. Thousands of people with fevered brains and throbbing hearts warmly greeted a Republican President as he stood on the portico of the Capitol announcing an administrative policy of Union and Love. But the South was alarmed and doubted and refused the olive branch of peace. A civil war ensued; slavery was overthrown; the government was re-established on a firmer basis than before, and the "mystic chords of memory" now "swell the chorus of the Union."

But let us look back at the West again. The metals that were washed from the beds of her streams and dug from the depths of her mountains, made money more abundant and lightened the burdens of the people. Prosperity is the mother of contentment, and it shed over them the sunshine of happiness. As her resources increased there followed wealth and power and confidence. New needs were created which required new industries and new means and new channels to supply them. Cities and towns were springing up in gulches and canyons. New railroads crossed the plains, and climbed the slopes and tunneled the summits, and the sudden growth of new mileage was so enormous that it astonished the capitalists of Europe. And with it all the mental horizon of the American people was broadened and the circle of their interests and activities enlarged.

Again new fields must be explored by skillful and hardy and adventurous men, possessing not only acuteness of observation but adaptability for the work by practical experience in the West. It was a miner, who had had experience in California, who first discovered gold in Australia in 1851, and thence followed that immigration that brought that far-off island continent under the white man's civilization and made it valuable as a province or a federation under the British Dominion.

We will not stop to speak of British Columbia or Nova Scotia or Mexico or Central or South America for they are of but passing interest when compared with the zeal that bordered on frenzy, that induced men to face cold and pestilence and hunger under the magnetic attraction of gold hunting through the desolate regions to the Klondike in 1896, and the barrenness of Nome in 1899. Had it not been for the quest and discovery of the money metals, Australia would probably have remained for many generations an unprogressive retreat for pastoral settlers and exiled convicts, and Alaska an unexplored region for the wandering Indians and her Ocean waters the playground for the seals.

But the money metals are found in other lands than ours. A transformation is going on in Africa, more slowly but little less remarkable, than that which went on in America from the days of the disappear-



ance of the Aztec races to the founding of an American Republic. Between the days when we used to read of the explorations of Livingstone and Stanley in "Darkest Africa," and the year of 1898 when sixty millions of gold was taken from the "Rand," the gloom of obscurity was lifted from that southern continent. Civilized men rushed into it from every country in Europe, and the trading instincts of every commercial nation of the earth entered its borders. The riches of the Transvaal and the Orange Free State presented untold possibilities of wealth to the adventurous and the timid alike, and quickly excited an avaricious cupidity which led to the war that gave Great Britain the supremacy of the continent. She already owned 2,800,000 square miles of territory in Africa, and as a consequence of the war she added to herself the lands of two nations, whose enormous beds of the money metals promise within a quarter of a century, the production of three billions of gold. Under such prosperous conditions the civilization of Europe and America with all their beneficent and elevating influences will take possession of Africa, and it will no longer remain a dark and waste place on the face of the earth.

Lord Kitchener, after surveying the interest of Great Britain in Africa, said: "England has the making of a new America in the southern hemisphere." He was partly right, for the changes have begun by which the desert plains and uplands and the water highways of that dark continent will be opened to universal commerce and to a better citizenship. But Lord Kitchener was partly wrong, for in no land, on any continent, in any hemisphere are found such boundless opportunities for enterprising people as in the United States of America. We have more agreeable lands, richer soils, better water ways and more capacious ocean harbors. We have lands which produce the products to feed and the materials to clothe the millions. We have untold sources of wealth in lumber and in every variety of mineral ores that make possible those artificial productions that have already made the United States the richest and the greatest of the manufacturing and commercial nations. Notwithstanding the great possibilities for Africa, the United States will draw unto herself more than the lion's share of the gold that shall come from the Transvaal.

America with her trans-continental railways has excited the emulation of Great Britain and Russia. The Cape-to-Cairo Railway of Africa and the Trans-Siberian Railway from St. Petersburg to Vladivostok will do for these countries what the building of the Union Pacific did for the western half of America. The north of Asia will soon have a new awakening. The Empire of Russia, whose population in a century has grown from thirty to one hundred and forty millions of people is becoming a power in the world's controversies. Her civilization may be medieval, and her industrial system may be archaic, but her determined purpose of expansion and her resistless ambition for power make her an international factor that must be considered and consulted in every movement in the Orient. Her future is big with possibilities of social and industrial and commercial changes.

The auriferous region of Siberia will ere long attract another rush of gold searchers to her bleak solitudes, and the wizard gold will eventually people with civilized men the heart of Upper Asia and bring mankind back to the "cradle of its race." The gold that has been found in Africa and the gold that will be found in Asia will be the companions of civilization in these progressive movements of the human race.

But here again our thoughts are irresistably drawn to the west of our country. The ocean that washes our western shores reaches to the east coast line of the Orient, connecting the newest of the new world with the oldest of the old. When we shall have more American ships upon this western sea, and a larger mingling of American golden civilization with Mongolian races, the commercial tonnage that will be floated on the Waters of the Pacific shall surpass in value and abundance the transportation across the Atlantic.

More than two hundred years ago, the man whose name had been honorably associated with the commencement of a new era in English commerce, and who devised the accepted plan of the Bank of England, dreamed of the opulence and wealth that would flow into the laps of an enterprising and intelligent people who would take possession of Darien and construct across the isthmus a commercial highway. In his enthusiasm he was wont to say that "who ever possessed that door of the sea, that key of the universe \* \* \* \* \* would give law to both hemispheres"; that Darien would become a vast warehouse for the wealth which would be poured into it "from Canton and Siam, from Ceylon and Moluccas, from the mouth of the Ganges and the Gulf of Cambay."

But the realization of the hopes and desires of William Paterson were not to come in his day. The fates of time postponed the act of connecting the two oceans, until in this our day, the building of the Isthmian canal shall give to the United States, the command of the commerce of the seas. But before that great work shall have been completed, there will come floating through the Golden Gate and into the harbor at Seattle, an ocean trade from the lands of the Orient richer in wealth and of far greater magnitude than the Scotchman predicted or the fancy of Macaulay could paint.

But there is more in the civilization of the West than the mere search for gain or the conquest of wealth. There are in it ideals of life as characteristic of the people as is their progressive spirit. I dare not say in words of my own all that I feel and all that I believe as to the future of our West. May I not borrow the words spoken but a few years ago by a senator from Massachusetts; "Our brethren and our children have done in the West what our fathers did in the East. Under new conditions, in a later age, on the shores of a more pacific sea, in a more genial clime, they are to repeat in the near future, the old and wondrous story. The world shall see in that far clime the streets of a wealthier New York; the homes of a more cultured Boston; the halls of a more learned Harvard; the workshops of a busier Worcester."

No class of people recognize better than we do, and none are more sensibly touched by the thought that we are all parts of one common country, and that whatever shall add to the prosperity of the whole nation wakes the strongest appeal to our highest sense of duty and strengthens in us the loyal bonds of patriotism and unity. We are lovers of education, broad in purpose, ennobling in character, sweetening and broadening the lives and work of men, which is the distinguishing feature of American national life.

But I would commend to our eastern friends the reading of the following statement from John Morley, "Great economic and social forces flow with a tidal sweep over the communities that are only half conscious of that which is befalling them. Wise statesmen are those who foresee what time is thus bringing, and endeavor to shape institutions and to mold men's thought and purpose in accordance with the change that is silently surrounding them."

John Morley was not thinking of our West when he wrote those sentences, but how aptly they fit the changes that the West is vigorously, actively and surely working in the social, political, industrial and commercial conditions of the United States. I wish I could have our eastern friends understand how boundless are the opportunities, how measureless are the resources in that area of country between the Missouri River and the Pacific, and how enterprising and progressive the people that built up the Empire of the West since the discovery of gold in California.

Decades in the life of a nation are as nothing. This Republic, grand and glorious as she is, has just started on her career. The future before her is vast, dim and immeasurable. "Nature is omnipotent, nations must float with the tide." But whether she is passing through the darkness and storms of uncertain conflicts, or moving



under all the splendor of the golden sunshine of peace and prosperity, the West and the East shall be forever one.

HON. E. W. MARTIN, OF SOUTH DAKOTA: Mr. President, I am sure I voice the sentiment of all present when I follow the precedent we have established today in remembering our distinguished visitors and I therefore move that we express our pleasure for this excellent address of Mr. Webster, by rising vote of thanks.

The motion was seconded, stated by the President and unanimously carried.

PRESIDENT RICHARDS: Any matter that pertains to the business of the Congress is now in order.

HON. E. W. MARTIN, OF SOUTH DAKOTA: I would like to announce that there will be a meeting of the Committee on Resolutions at 10 o'clock tomorrow forenoon in the Business Men's Club in Deadwood. It is not desired that this shall interfere with any of the program for tomorrow and of course it will not with the visit to the Homestake mine, which, I understand will be in the afternoon, but numerous resolutions have been referred which we have not had an opportunity to examine and we would like a meeting of that committee tomorrow and I wish the Secretary would read the list of the members of this Committee, as I think some have not been informed that they have been appointed.

Secretary Mahon read the list of members of the Committee on Resolutions.

HON. E. W. MARTIN, OF SOUTH DAKOTA: Mr. President, the committee on resolutions asked me to ask an instruction of this body and while I did not expect to do so until some subsequent meeting, I am reminded by a member of the committee that perhaps this was a timely opportunity as we appear to be out of business at the present time. Numerous resolutions have been referred to us; some of those resolutions pertain plainly to matters of mines and mining, either directly or remotely, some of them have no possible connection with the subject of mines and mining at all and the committee would like instructions from the Congress as to whether it is the desire of the Congress that this committee shall consider seriously and pass upon, either by recommending or refusing to recommend, resolutions that have no connection with the subjects of mines and mining, either directly or remotely.

PRESIDENT RICHARDS: If you will permit the chair to make a suggestion—if you will remember correctly, upon reading the by-laws you will notice there the aims and purposes of the American Mining Congress as set forth by the Executive Committee. That is more fully set forth in the articles of incorporation and, of course, you will notice that the aims and purposes of this corporation and its by-laws, is to limit these questions to matters pertaining to mining directly or indirectly and if you are to adhere to the purposes of the incorporation it strikes me that you would answer the question of the gentleman, but however, we would like a suggestion from any member on that question.

COLONEL GEORGE, OF SOUTH DAKOTA: I would suggest that the Committee will first take up those matters that pertain to mines and mining, the securing of legislation from the national congress necessary to give us relief and that when they report the resolutions a time should be fixed for the Congress to consider them. There ought to be a distinct hour to take up each subject as reported. Let the Congress make its rules and adhere to them and get them through in a business way, so that when the Congress of the United States meets, we will have something to present there in a business manner, something that will command respect and attention and get the support of every man honestly engaged in getting the mining laws so

shaped as to benefit the mines and mining, coeval with the laws that now pertain to the agricultural department. We want legislation from that body that at least will give us as much aid and benefit to mining as congress aids every year agriculture and other industries. We want some practical, hard common sense legislation for the benefit of mining. We want to get our demands in shape and send them to congress in the form of resolutions. Therefore I would ask this committee to confine itself to that which pertains to mining, the best methods of treating ores and ask the government aid in finding out what is in the ores. We want to find out how much gold can be saved out of ore carrying three dollars now. We want every government analysis and test concerning our ores, so that we may be better enabled to treat them. We desire our mining laws amended so that the mining men at least will be put on a par with others. We desire our laws changed with reference to the survey of the public mineral lands. The only thing to do is for the mining men to say what they want. We do not ask any favors other than our share of government help but we propose to have an equal showing with the men that raise hogs and cattle and it is our duty to inform congress what we desire and what rightfully belongs to us, and we must tell our representatives what we want, they will not give us anything that is not asked for. Therefore let us get together and formulate our wishes in the form of resolutions that our representatives in congress will be enabled to give us such legislation as we should have for these matters.

MR. BUCKLEY, OF MISSOURI: I would move you Mr. President, that the committee on resolutions be referred to Article 2 of the proposed constitution and by-laws and that they use this article for their instruction with regard to acting upon the resolutions that have been presented to this Congress.

Secretary Mahon read the article referred to.

HON. E. W. MARTIN: Mr. President, the committee are quite familiar with the proposed by-laws and also with the constitution but the idea of the committee is that neither the time of the committee nor the time of this Congress ought legitimately to be taken up with the serious consideration of matters that have no reference to the purposes as defined in this article, but in face of that fact we are having referred to us in a serious way for consideration various matters which do not pertain to mines and mining directly or indirectly. We might have exercised in arbitrary course with reference to these matters and suppressed those resolutions in the committee, but it seemed to us best to have the sense of Congress upon that subject. To illustrate, my friend George has introduced a resolution asking the admission of Oklahoma as a state in this nation. We may all be favorable to an active Congress of that character but it has no connection either directly or remotely, as it seems to us, with the subjects for deliberation of this Congress. I do not know that there is any mining carried on in the state or proposed state of Oklahoma, and if there were it would not make legislation of that kind pertinent to the purposes of this organization and it is for the purpose of not seeming discourteous to this sort of a resolution, but our having the feeling of this Congress upon it, that in seriousness we ask for instructions.

MR. PATTERSON, OF NEBRASKA: I would second the motion of Dr. Buckley in order to bring us to a head and a conclusion. I think the section read covers the situation identically.

PRESIDENT RICHARDS: It has been moved and seconded that the committee be referred to Article 2 of the by-laws of this organization for instructions with regard to acting upon resolutions which have been presented to this Congress. Are you ready for the question?



MR. CONZETTE, OF SOUTH DAKOTA: Mr. President, it strikes me that in giving the committee the entire hour absolutely to decide those questions that you are taking something from this convention that rightfully belongs to it. It doesn't strike me that it is proper to throw the entire disposition of those things into the hands of that committee, but of course it strikes me that they ought to have a limited power, something of this nature: that, for instance, any resolution that has been referred to that committee that they are to report to our convention with their recommendation and if any resolution has been submitted to them that they believe is not of interest to the mining industry in reporting that resolution they should so state, then the convention can decide whether it believes that of interest to the mining industry or not, and I would move you as an amendment to that motion that this committee report the several resolutions that have been referred to it with their recommendations and the convention then to decide for itself. I do not like to delegate my opinion about those things to any second party and I want a voice in its decision and I believe every other member of this organization would like to have a voice in those questions because this Section 2 gives a very wide latitude and it would put a power in the hands of the committee that I do not think rightfully belongs there.

PRESIDENT RICHARDS: The question now is on the original motion, there being no second to this one. All in favor of that say "aye," those opposed "no." The motion was carried.

A resolution recommended by A. M. Donaldson, of Colorado, relating to the purchase and use of silver by the government was offered and read by the secretary and by the president referred to the committee on resolutions.

MR. CONZETTE, OF SOUTH DAKOTA: I would just like to ask now for information; provided this committee should see fit to turn down that resolution and say that it is not pertaining to the mining industry directly in any manner, has that committee the power to do so?

PRESIDENT RICHARDS: The chair states that had your motion been seconded the chair would have ruled it out of order because the committee could make nothing further than recommendations and it would have been a useless amendment because no committee could take from this body its right to exercise whatever judgment it would see fit upon any question. I think it was very proper for them to ask a little instruction from this body and to get its sentiment, so that when that question comes up from that committee whatever the recommendation may be it will then be in the hands of this Congress for action.

MR. CONZETTE, OF SOUTH DAKOTA: Do I understand by that resolution that that committee has the power to decide as to whether it shall suppress a resolution or present it before this convention?

PRESIDENT RICHARDS: I do not understand it that way.

MR. CONZETTE, OF SOUTH DAKOTA: That is the way I understood it.

PRESIDENT RICHARDS: This Congress, of course, has control of every question that comes before it. The committee on resolutions will report on the resolutions and then it will be before this Congress for final disposition.

MR. CONZETTE, OF SOUTH DAKOTA: Supposing the committee fails to report any resolution that has been offered to it?

**PRESIDENT RICHARDS:** Then this Congress has a right to call for a report upon any resolution it may require. The individual has a right to call upon this Congress to ask for a report, if Congress sees fit to do so in such a case; that has always been the rule, everyone will always have a chance under our rules in this Congress to ask for a report. I know that is the purpose of the committee and it strikes me a very proper request that they get the sentiment of the Congress upon that question because it is a new one. They will not be shut out to be heard upon any question except something ruled out by the body.

**MR. CONZETTE, OF SOUTH DAKOTA:** My reason for speaking on this subject was in this way; we see of course that all of the various industries of the country have their organizations; take the wool growers of the west, they have their organization, and sugar growers, the steel and iron men of the east and they are all of course devoted to the advancement of their particular industries and when these questions come up in their organizations they debate everything that pertains to their industry. For instance, if the wool growers' convention was in session and the question of tariff on wool came up, it would be discussed in the same manner as the growing of wool would, because it would directly pertain to the interests of that industry and to its advantages, whether there was a tariff on wool or whether there was not, and if any man in the wool growers' convention was to get up and say: "This is not a political organization, you must not introduce a political subject, which the tariff is," he would receive very scant courtesy from the balance of those members of that organization. Because, while the organization would be non-political, the fact of a high or low tariff on wool would be of very great importance to that industry and they would discuss it just the same as they would the growing of wool in any manner, and thus the questions will come up in this convention in directly the same manner and we expect to discuss them in that manner just in the same way.

**PRESIDENT RICHARDS:** Your inquiries are very pertinent and very proper but we are undertaking to define as closely as possible a line under the aims and purposes of the Congress for it to follow. It is very proper to bring it up and there is no question but what this Congress will give fair consideration to every question that pertains to its interests.

It was moved, seconded and carried that Congress adjourn until Friday morning, September 11th, 1903, at 9:30 A. M. to meet at Lead, South Dakota.

Lead, South Dakota, September 11th, 1903, 9:30 A. M.

**PRESIDENT RICHARDS:** Congress will be in order. Before taking up the regular business, if there are any resolutions to introduce this is a good opportunity to do so.

**MR. HOLMES, OF MISSOURI:** I have a resolution which I desire to have read and referred to the committee on resolutions, regarding the establishment and maintenance by the United States of one or more institutions in each state and territory, the purpose of which shall be the giving of instruction in subjects relating to mining and metallurgy and for carrying on investigations in these subjects.

The resolution was read by Secretary Mahon and by the president referred to the committee on resolutions.

**PRESIDENT RICHARDS:** The chairman of the committee on resolutions requests me to state that the committee is in the Golden Star rooms and would like to have any resolution sent over as speedily as possible so that if there is any other resolution to be presented, this is a good opportunity; otherwise the resolutions submitted will be referred to that committee at once.



MR. PATTERSON, OF NEBRASKA: The chairman of the committee on credentials desires to make his report.

The report was read by the secretary and is as follows:

Deadwood, S. D., September 11, 1903.

To the President and Members of the American Mining Congress:

Gentlemen:—Your committee duly appointed on the credentials of members to this Congress beg to report that they have found five hundred and forty-eight duly accredited and appointed delegates to this Congress; and two hundred and twenty-six permanent members, making a grand total of seven hundred and seventy-four, who are legally entitled to be present and participate in all the proceedings of this, the Sixth Annual Session of the Congress.

Yours most respectfully,

RICHARD C. PATTERSON, Chairman.

W. T. TARBELL,

C. A. HUTCHISON,

Committee.

I would state ex parte that I have the credentials with me of all those who have handed them to me and if they desire they can have them returned. They are here on the table.

MR. RUSSELL: Mr. President, I move you the adoption of the report of the committee on credentials.

MR. GEORGE, OF SOUTH DAKOTA: I second the motion.

The motion was stated by the president and unanimously carried.

The following is the complete list of members and delegates present:

#### ARIZONA.

Ewing, Col. Thos. ....	Phoenix
Mills, C. E. ....	Phoenix
McLean, Milton ....	Phoenix

#### CALIFORNIA.

Mitchell, Capt. E. Pryce ....	Santa Barbara
Jones, John T. ....	Los Angeles
Ewing, Col. Thos. E. ....	Los Angeles

#### COLORADO.

Donaldson, A. M. ....	Denver
Browne, Col. Ed. F. ....	Aspen
Tarbell, W. S. ....	Colorado Springs
Abbott, Jas. W. ....	Denver
Beam, T. Walter ....	Denver
Buckley, W. S. ....	Denver
Wygant, Luther H. ....	Denver
Shepherd, F. E. ....	Denver
Cammatt, Ira A. ....	Denver
Healey, Arthur E. ....	Boulder
Ballard, Fred L. ....	Colorado Springs
Schneider, G. W. ....	Colorado Springs
Merrill, H. S. ....	Boulder
Hammond, L. P. ....	Boulder
Downing Jas. M. ....	Aspen
Mills ....	Denver
Sander, Frank F. ....	Colorado Springs
Brennan, Edgar H. ....	Colorado Springs
Mathews, Oliver ....	Colorado Springs
Vanatta, J. K. ....	Colorado Springs
Shoup, O. H. ....	Colorado Springs
Haggatt, Lieut-Gov. W. A. ....	Colorado

## ILLINOIS.

Ede, J. A. .... LaSalle County  
 Law, Mrs. D. H. .... Dixon

## IOWA.

Gable, J. H. .... Crawford County  
 Moore, Robert H. .... Ottumwa

## IDAHO.

Jackson, O. E. .... Boise  
 Richards, Hon. J. H. ....  
 Jenkins, Hon. Francis ....  
 Garver, W. A. .... Spokane

## INDIANA.

Hargrove, Geo. .... Terre Haute  
 Simmons, C. B. .... Indianapolis

## MONTANA.

Kemper, Simeon V. ....  
 Lynch, Jas. .... Butte  
 Winchell, S. N. .... Butte  
 Kemper, Simeon V. .... Butte  
 Brown, Daniel .... Butte  
 Harris, Hugh C. .... Butte

## MISSOURI.

Johnston, B. H. .... Mendota  
 Buckley .... Rolla  
 Walton, William .... Highbee  
 Holmes, Prof. J. A. .... St. Louis

## MINNESOTA.

Webber, Clarence .... Minneapolis  
 Derringer, O. S. .... St. Paul  
 Hanson, P. N. .... Minneapolis  
 Appleby, Prof. Wm. R. .... Minnesota  
 Bennett, Geo. M. ....  
 Orr, Thos. G. ....  
 O'Connor, P. D. .... St. Paul

## MICHIGAN.

Davies, M. L. ....

## MAINE.

Ricker, Asa L. ....  
 Small, J. T. .... Lewiston

## NEBRASKA.

Nicholson, H. H. .... Lincoln  
 Stueffer, Wm. .... West Point  
 Dorsey, Geo. W. E. .... Fremont  
 Patterson, Richard C. .... Omaha  
 Webster, John L. .... Omaha  
 Andrews, I. N. .... Alliance  
 Lawler, William .... Lincoln  
 Cochran, S. T. .... Lincoln  
 Williams, Elmer ....

## NORTH DAKOTA.

Wilder, Frank A. .... Grand Forks



## NEW YORK.

Earle, Henry .....	New York
Crawford, Henry E. ....	New York

## OHIO.

Culver, Henry .....	Elyria
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## OREGON.

McLaughlin, J. A. ....	Sumpter
Watson, Frank W. ....	Portland
Drake, F. V. ....	Grants Pass
Myers, Jefferson .....	Salem
Muir, Thos. K. ....	Portland

## PENNSYLVANIA.

Dignowity, C. L. ....	Philadelphia
Heckler, C. F. ....	Philadelphia

## SOUTH DAKOTA.

Gossage, Jas. B. ....	Rapid City
Halley, James .....	Rapid City
McShane, A. G. ....	
May, Ernest .....	Lead
Overpeck, A. C. ....	Keystone
Hare, Jos. ....	Keystone
Martin, C. A. ....	Sturgis
George Jas. A. ....	Deadwood
Blatchford, John .....	Terry
Carroll, John D. ....	Lead
Blackstone, Richard .....	Lead
Steward, Wesley A. ....	
Irwin, E. F. ....	Lead
Thompson, Geo. B. ....	Lead
Gushurst, P. A. ....	Lead
Martin, E. W. ....	Deadwood
Phillips, K. G. ....	Deadwood
Selbie, William .....	Deadwood
Star, Sol .....	Deadwood
Pryce, O. U. ....	Deadwood
Harrington, J. T. ....	Deadwood
Franklin, Harris .....	Deadwood
Rice, W. G. ....	Deadwood
Thompson, Moses .....	Deadwood
Thegory, Thos. ....	Lead
Crow, I. R. ....	Lead
McQuillan, James .....	Lead
Cotton, James .....	Lead
Thornby, W. J. ....	Deadwood
Slagle, R. L. ....	Rapid City
Moody, Chas. C. ....	Sturgis
Blatt, Max .....	Sturgis
Pilcher, Jos. E. ....	Custer
Gamble, R. J. ....	Yankton
Baldwin, F. R. ....	Maitland
Todd, J. E. ....	Vermillion
Lawson, J. M. ....	Aberdeen
Mann, M. M. ....	Aberdeen
McNeary, John .....	Aberdeen
Gray, John .....	Terraville
Jackson George S. ....	Deadwood
Wood, G. A. ....	Milbank
Freeman, J. W. ....	Lead

Sawyer, John F. ....Roubaix  
 Burke, John L. ....Hot Springs  
 Grier, T. J. ....Lead

# UTAH.

Gilmer, Charles .....Salt Lake City

# WASHINGTON, D. C.

Parker, Edward W. ....  
 Darton, Nelson H. ....

# WYOMING.

Danielson, Andrew .....Sundance  
 Nobs, Alfred .....

# WISCONSIN.

Goodner, T. E. ....

# WASHINGTON.

Long, Albert .....Pomeroy

PRESIDENT RICHARDS: Are there any other matters you desire to take up before taking up the question of by-laws?

MR. BUCKLEY, OF MISSOURI: I move you, Mr. President, that we proceed to the consideration of the proposed by-laws.

PRESIDENT RICHARDS: That being a special order a motion is not required.

MR. BUCKLEY, OF MISSOURI: That they be taken up section by section, considered that way and adopted.

PRESIDENT RICHARDS: That was part of the original motion.

MR. GEORGE, OF SOUTH DAKOTA: Before we start in, I would make a motion that in discussing these by-laws that all the debates be limited to two minutes.

MR. PATTERSON, OF NEBRASKA: I second the motion.  
 The motion was stated by the president and duly carried.

MR. RUSSELL, OF SOUTH DAKOTA: I desire to call attention to the fact that in the second section of the Daily Mining Record, which is on the seats here, a copy of these proposed by-laws may be found, on the first page of the second section.

PRESIDENT RICHARDS: The secretary will read the first article of the proposed by-laws.

Secretary Mahon read the section.

PRESIDENT RICHARDS: On that section, gentlemen, I would state that the last Congress instructed the executive committee to incorporate this body; we assumed that that gave the committee the right to name the body and the articles of incorporation on file at Denver name this Congress "The American Mining Congress," so I presume it would be useless to waste any time upon that question, as it has been settled by the articles of incorporation.

Secretary Mahon read Article 2 of proposed by-laws.

PRESIDENT RICHARDS: What is your pleasure with that section, gentlemen?

MR. PATTERSON, OF NEBRASKA: I would like to ask for information with reference to one part of that section, "To promote a more co-operative tendency in the evolution of agriculture." Why agriculture? Now, if it read "To promote a more co-operative tendency in the evolution of mining, manufacturing, transportation and the commerce thereof," I would suggest, "and for the particular pur-



pose of bringing the mining men of the United States into closer relation with one another and to promote a friendly feeling for one another through social intercourse and the discussion of mutual interests" is what I am in favor of. I simply inquire, perhaps I do not know—I do not think I do—why the evolution of agriculture should be mentioned in connection with mining; probably it was overlooked.

PRESIDENT RICHARDS: I think the chair can state the object the committee had in view at the time and that is that they seemed to be looked upon by the government as matters that are wholly apart and that the laws of this western country especially, if not of the east as they are permanently established, should be a more harmonious whole and that there are some questions that so far as legislation is concerned directly affect both, and it was the hope that we could have the benefits of a co-operative tendency in the development of the west along western lines especially, as the east have already had their special development along their particular lines, and to obtain the sympathy and co-operation of those two great industries, that was the purpose intended to be aimed at as I understood it.

MR. PATTERSON, OF NEBRASKA: I can say your object was very laudable, but in this age of progress and advancement we are not developing along lines of a general character, taking in three or four or five or more interests, but we are rather beginning to take up specialties and working especially in its behalf and making that specialty so prominent and being taken care of so well that it is respected for its strength. Now you would mix mining men and farmers together; I am a farmer, have been one all my life until I quit some few years ago.

I am interested in mining now and I do not know of a single farmer among my friends that cares a snap of his finger about your mining interests; in fact, he doesn't know anything about it, he doesn't want to know anything about it. In fact, when you come to speak to him about it he gives you what we call in common slang "the horse laugh." He would not put a dollar into mining stock, but he would invest every dollar and every nickle he has in a cow or steer or a horse or a hog, and that is all right. Let the agricultural people form their society and have their congress; if they want to hear from the Mining Congress let them give us an invitation and we will send representatives that will represent our interests. The professional man today that makes a success is not a general practitioner like he used to be; the lawyer today that makes a success in the large cities is not a lawyer in all branches of legal learning; he has his reputation, as a corporation lawyer, for instance, or his reputation as a realty lawyer or a criminal lawyer—

PRESIDENT RICHARDS: Under the rules your time has expired.

MR. BUCKLEY, OF MISSOURI: I believe the conditions which exist in our own state and in Nebraska and in other neighboring states are not the same as they are in the western states. That in the past there has been some friction between the agricultural interests and the mining interests, especially with reference to the use of water, and that the west is particularly interested, the western mining men are particularly interested in those resources which contribute not only to his welfare but to the welfare of the agricultural man and that there must be in the west a more co-operative tendency between the agricultural and mining interests. I think this is especially so in the western states, with which I am not so familiar as some of our members present here this morning, and I think it is important that this section should remain. There was no idea in placing this in the objects of the American Mining Congress to bring about any particular effort in the interests of agriculture. There was no attempt to further especially the agricultural

interests only in so far as agriculture and mining in the west must develop hand in hand. I think that is the idea that the executive committee had in mind in placing this sentence in the objects.

MR. CONZETTE, OF SOUTH DAKOTA: In order to simplify that matter I would like to offer a suggestion. After the word "commerce," insert the words "connected with the mining industry." That would make that paragraph and sentence read, "To promote a more co-operative tendency in the evolution of agriculture, mining, manufacturing, transportation and commerce connected with the mining industry."

MR. PATTERSON, OF NEBRASKA: I would accept that if you will add the word "and the commerce connected with the mining industry." I do not wish to cut out the agricultural men, but if we are going to be a mining congress we want to be a mining congress and not an agricultural organization, with all due respect to agricultural organizations. Striking out the word "agriculture" and taking the word "mining" first, which I think is proper in this case. Why give the word "agriculture" first mention in your by-laws, when you are a mining congress? The suggestion here of this gentleman from South Dakota meets with my approval except the word "mining" should precede the word "agriculture."

MR. RUSSELL, OF SOUTH DAKOTA: Mr. President, I think Mr. Buckley has stated the reasons that governed the executive committee in this matter clearly. We recognize the fact that in this western country these interests are connected closely, especially along the lines of the use of waters, but it seems to me also, Mr. Patterson has raised a point that is worthy of consideration and while I do not go to the same extent that he does, it seems to me, however, it would be better that we were to place the word "mining" before the word "agriculture," and not strike out the word "agriculture," but make the first word of this clause in naming the interests "mining."

MR. GEORGE, OF SOUTH DAKOTA: We have an irrigation congress; congress has appropriated a large amount of money for irrigation. I am free to confess I do not understand the law exactly but if this government builds the large reservoirs at Belle Fourche, is that for the benefit of agriculture or for mining? The fact of it is agriculture and its interests have all they want, and I move you, Mr. President, to let the paragraph stand as it is and strike out the word "agriculture."

MR. PATTERSON, OF NEBRASKA: I second the motion.

PRESIDENT RICHARDS: It has been moved and seconded to amend this section by striking out the word "agriculture." Those in favor of striking out the word "agriculture" please rise to their feet.

A DELEGATE: Mr. Chairman, have the delegates a right to vote?

PRESIDENT RICHARDS: I would like to make this suggestion: This is a legal question as I understand it, we are now passing upon the by-laws of a legal corporation, which, under the statutes of Colorado require the legal adoption of its by-laws. It has been suggested and I think the suggestion is a good one that all delegates be permitted to participate in the discussion and vote for the by-laws, section by section, and then adopt it as a whole to make it legal, and if there is no objection the delegates may vote on the by-laws, section by section, but when we come to adopt the by-laws as a whole in order to make it legal then the members only will vote upon the question. If there is no objection we will let that stand as a rule.

The motion was again stated by the president and lost.



MR. BUCKLEY, OF MISSOURI: I will move that the section be so amended as to read as follows: "To promote a more co-operative tendency in the evolution of mining, manufacturing, agriculture, transportation and commerce."

MR. RUSSELL, OF SOUTH DAKOTA: I second the motion.  
The motion was stated by the president and carried.

PRESIDENT RICHARDS: A motion to adopt the section as amended will be in order.

MR. RUSSELL, OF SOUTH DAKOTA: I move the adoption of Section 2 as amended.

MR. GEORGE, OF SOUTH DAKOTA: I second the motion.  
The motion was stated by the president and carried.  
Secretary Mahon read Section 1 of Article 3 of the proposed by-laws.

MR. CONZETTE, OF SOUTH DAKOTA: Mr. President, I move the adoption of Section 1 of Article 3 of the proposed by-laws.

MR. GEORGE, OF SOUTH DAKOTA: I second the motion.  
The motion was stated by the president and carried.  
The secretary read Section 2 of Article 3.

PRESIDENT RICHARDS: Hearing no objection we will consider it adopted.

The secretary read Section 3 of Article 3.

PRESIDENT RICHARDS: Hearing no objection to this section it will stand adopted.

Secretary Mahon read Section 4 of Article 3.

PRESIDENT RICHARDS: Hearing no objection to this section it will stand adopted.

The secretary read Section 5 of Article 3.

PRESIDENT RICHARDS: Hearing no objection to this section it will stand adopted.

MR. RUSSELL, OF SOUTH DAKOTA: Do you wish to adopt this article by itself?

PRESIDENT RICHARDS: Just as the Congress wishes.

MR. RUSSELL, OF SOUTH DAKOTA: I move the article as read, being Article 3, be adopted.

The motion was seconded, stated by the president and carried.  
Article 4 was read by the secretary.

MR. RUSSELL, OF SOUTH DAKOTA: As a member of the executive committee that acted upon this article, I wish to say that at that time it seemed to me that it was correct, but since that time, after considering it, it has seemed to me that possibly that board made an error. It seems to me from our experience of this year that in restricting the appointments by the governors and the heads of countries to fifteen members that we have restricted it too much. We all know that the governors are influenced largely in their appointments in these matters by political considerations in part. It is not always so but generally so and in limiting the appointments by governors to fifteen, in some cases they have no more than enough places to name gentlemen that they wish to honor in their own state and yet whose interests are identified with mining and who are not at all likely to attend the Congress. Recognizing the fact that they will unquestionably do so and believing that it is necessary that there should be a greater latitude in that matter; so that there may be representation in every state under

the appointments of the governors, I move you, sir, that instead of fifteen members that the article should read, "The chief executive of any country, state or territory may appoint as delegates to any session of this Congress thirty persons actively associated with mining."

MR. JOSEPH B. MOORE, OF SOUTH DAKOTA: I second the motion.

PRESIDENT RICHARDS: It has been moved and seconded that we substitute in lieu of the word "fifteen" the word and figures "thirty" (30).

MR. GEORGE, OF SOUTH DAKOTA: The chief executive of any state cannot appoint a man except he is actively engaged in mining and it rests with this Congress to say when a man as appointed by an executive to come here that if he is not actively associated with mining then his appointment is null, because such governor or executive has done what he has not a right to do and I think that no appointment of delegates should be made except such as are actively engaged in the mining business or associated with it and not politicians alone. A man's politics has nothing to do with this Congress; if he is associated with or actively engaged in mining then he is an eligible member if the governor appoints him and if he has not those qualifications he is not eligible. The thing we ought to do is to get delegates interested in mining. I shall hope this convention will vote down a proposition to increase it to thirty because from the very argument the gentleman makes if it is force at all, in place of getting rid of fifteen politicians we would have thirty. I think we had better keep down to fifteen.

MR. PATTERSON, OF NEBRASKA: Without having known that my friend Mr. Russell was a member of the executive committee or having known anything about it all except what I read of here in this article No. 4, it impresses me that it would be a better idea to decrease the number instead of increasing, and by decreasing raise the dignity of the appointment.

Now the impression prevails throughout Iowa and Nebraska that an appointment to any mining congress, not only this one, but to any other one, by the governors, is a matter of very small honor, because anybody can get the appointment that makes the application because the governor is only pleased to have the names of fifteen men; he makes no inquiry about them, as to whether they are associated with mining or not. Now I read this all over very carefully this morning so I would be intelligently informed as to what was desired here and this particular article impressed me that it would be better to cut this fifteen down to ten than to have fifteen, and thereby dignify the importance of the appointment and get mining men. You can get ten mining men out of every state; a politician has no business to be appointed if this section is adopted. Why? Because it says "persons actively associated with mining." What does that mean? It means that you must be actively engaged in the work and that is what it ought to be.

MR. BUCKLEY, OF MISSOURI: I would like to say in reference to this article that it was the intention of the executive committee to raise the dignity of the appointment by reducing the number of delegates from thirty to fifteen and I agree with Mr. Patterson when he says that it would also increase the dignity of the appointment by decreasing the number of delegates from fifteen to ten, and I would like to ask the secretary a question; if at the present Congress the governors of the states were directed to appoint only men who were actively associated with mining?

SECRETARY MAHON: No, sir, they were not.



MR. BUCKLEY, OF MISSOURI: I think the governors of the states, if they knew this Congress would not recognize a delegate appointed by them and not actively associated with mining, would give this Congress more consideration than they do at the present time.

SECRETARY MAHON: You asked me a direct question; I want to give you a direct and truthful answer. The governors were not specially notified as to the matter to which you have called attention this morning, but to every governor, to every chamber of commerce and to every organization that was invited to appoint delegates a copy of the by-laws was enclosed with the letter.

MR. BUCKLEY, OF MISSOURI: I do not wish to cast any reflection upon the secretary, because he had no authority to demand of the governors of the various states to appoint delegates who were actively associated in mining, because the proposed by-laws and constitution were not adopted or had not been adopted prior to this session and he is not in error in any way by not making this request.

SECRETARY MAHON: I understood it that way, Mr. Buckley.

MR. CONZETTE, OF SOUTH DAKOTA: I feel in full sympathy with the discussion of Mr. Buckley on that question and I would move to amend that motion before the house by inserting the word "ten" instead of "fifteen."

PRESIDENT RICHARDS: It has been moved and seconded to amend the motion to amend by substituting the word and figures "ten" (10) instead of the word and figures "thirty" (30) in the amendment. Are you ready for the question?

The motion was carried.

PRESIDENT RICHARDS: Now the question is: Shall this section be adopted by substituting the word ten and the figures 10 in lieu of the word and figures fifteen (15) as in the originally proposed by-laws. Are you ready for the question?

The motion was carried and the amendment adopted.

PRESIDENT RICHARDS: What is your further pleasure on that section?

MR. GEORGE, OF SOUTH DAKOTA: I would move that mining associations be allowed to appoint one delegate to every ten members of the mining association; if the mining association has got fifty active men in it let them appoint five, if it has one hundred let them appoint ten; so I will move that the delegates appointed by mining associations shall be one for every ten members.

MR. LYNCH, OF MONTANA: Inasmuch as it is incumbent upon members attending this Congress to pay their own expenses and I know of no other appropriation being made from any quarter, it would seem to me that a mining organization such as a miners' union might take some interest in appointing the delegates to attend a Congress of this character if the number of members they were entitled to were decreased. We have in Butte the largest mining organization in the United States, I believe, and I think our union there would take pleasure in appointing one delegate to represent our union at their expense, and no more.

MR. BUCKLEY, OF MISSOURI: I rise to a point of order. I would like permission to second Colonel George's motion.

PRESIDENT RICHARDS: It is well taken. It is moved and seconded that we amend this section by adding in lieu of the word "three" now in this section that each mining association and other

bodies there named shall appoint one delegate for each ten members thereof. Are you ready for the question?

MR. GEORGE, OF SOUTH DAKOTA: Mr. President, I want to say that the mining associations I was speaking of was not the miners' unions. We have a miners' association here in the Black Hills of about five hundred members. Now this miners' association embraces the whole Black Hills and we are limited to three men. There are five or six counties in this Black Hills country and the miners' association could not even get a man from each county. I wanted to get the expression of the association with reference to this matter. We want a representative from the mining men's associations and the men actively engaged in mining; the Mining Men's Association would have a fixed ratio by which they could send delegates sufficient to be an inducement to them to build up their association, because the more members they have in the association the more delegates they could send to Congress.

PRESIDENT RICHARDS: Did I understand your motion then to apply simply to mining men's associations?

MR. GEORGE, OF SOUTH DAKOTA: Yes, sir.

PRESIDENT RICHARDS: So the motion now before the house then is to amend this article as to mining men's associations so that such associations shall have the privilege of appointing one delegate for each ten members, rather than three as it stands.

MR. PATTERSON, OF NEBRASKA: I am opposed to that. I understand there are five hundred members in the Black Hills mining men's organization, that would give them the right and privilege to appoint fifty delegates. They do not want to do that. If we gave them that permission they would not appreciate it. If you will cut it down to about two or three there will be a fight among about fifteen or twenty of them to get the appointment and the two or three men who get the appointment will go to the Congress feeling they won their spurs at home and will fight for something when they get there. What is the use of having drones in our Congress? Better close up the doors. I shall make a motion probably before these by-laws are adopted that every member who is appointed as a delegate to this Congress from any organization, that he shall attend sessions of Congress when in session or shall be fined for his absence unless he is excused. I believe that I voice the sentiment of the men here this morning on that point and I wish there were more here. I don't believe in being what they call a "dead" one in anything; be alive. So I am opposed to one delegate in ten or one in fifty or one in a hundred of this Black Hills organization; not that I have anything against the Black Hills organization or any other, but I believe in making the organization a dignified one. We have a dignified president for instance (Applause) and I want it done along these lines; appoint delegates that are able to take care of their interests and represent their interests from wherever they may be sent.

MR. CONZETTE, OF SOUTH DAKOTA: I would be opposed to the resolution as it was offered on the same grounds that Mr. Patterson is and not only that, but I would be opposed to it on the further grounds that it was discriminating against the real miners of the country, miners' organizations; they are more nearly miners than members of this Mining Men's Association or more universally so, for the reason that many of the members of the Mining Men's Association are actually not directly associated with mining; they are indirectly perhaps because they are living in a mining country, but there is perhaps very few members of the miners' union but what are actively engaged in mining, all of them, and of course I would be opposed to discriminating in favor of any organization connected with mining as against the miners' union. I think we



should put everyone that is actively engaged in the mining industry on the same footing, whether it is a mining men's organization or whether it is any other organization in a mining country composed largely of mining men. As I understand it, the proposed by-laws limit these organizations to the appointment of three delegates which, it seems to me, that is limiting the number to a reasonable amount and that ought to give us a good representation from all other organizations.

MR. RUSSELL, OF SOUTH DAKOTA: It seems to me that it is wise and right that there should be a distinction in this delegate representation between men that are identified with mining in any way and between organizations that consist of mining men or miners' organizations. I have no discrimination to make between miners' associations or the miners; place them on an equality; but I do believe that associations of this kind are entitled to a greater representation here than boards of trade, chambers of commerce, county commissioners and concerns of that kind. I feel that our representation should be based on mining men's organizations, whether they be the mining associations as we distinguish them or miners' unions, make no discrimination there at all, but I do wish a discrimination made in favor of strictly mining organizations against trade organizations.

MR. GEORGE, OF SOUTH DAKOTA: With the consent of the chair I will withdraw my motion to amend.

PRESIDENT RICHARDS: Of course the chair has no control of the matter, but if I hear no objection we will consider it withdrawn.

MR. BUCKLEY, OF MISSOURI: I wish it understood my second to the motion was simply to bring it before the house. I shall be very glad to withdraw my second.

PRESIDENT RICHARDS: Then if there is no objection we will consider the motion withdrawn.

MR. RUSSELL, OF SOUTH DAKOTA: I would suggest that this be passed for the present time.

PRESIDENT RICHARDS: If there is no objection we will pass it. Secretary Mahon read the first section of Article 5.

PRESIDENT RICHARDS: Hearing no objection Article 5 will stand adopted.

Secretary Mahon read Section 1 of Article 6.

MR. GEORGE, OF SOUTH DAKOTA: I offer a substitute for that whole article which I will ask the secretary to read.

Secretary Mahon read the substitute offered for the whole article.

PRESIDENT RICHARDS: I have heard no second to this motion to substitute.

MR. BUCKLEY, OF MISSOURI: Mr. President, I would move you the adoption of Section 1 of Article 6 of the by-laws as read by the secretary.

Which motion was seconded and carried.

Secretary Mahon read Section 2 of Article 6 of the proposed by-laws.

MR. BROWN, OF COLORADO: I move the adoption of the section as read.

The motion was seconded, stated by the president and carried.

Secretary Mahon read Section 3 of Article 6.

It was moved and seconded that Section 3 of Article 6 of the proposed by-laws be adopted, which motion was carried.

Secretary Mahon read Section 1 of Article 7.

MR. BROWN, OF COLORADO: I move the adoption of Section 1, Article 7 of the proposed by-laws.

The motion was seconded.

MR. PATTERSON, OF NEBRASKA: Let me inquire who is meant by "except an active member of this association in good standing."

PRESIDENT RICHARDS: The aim of the executive committee was to include only legal members, that is those who became active members of the corporation by paying annual dues, which makes them in good standing. The dues are five dollars for the membership fee and two dollars annually thereafter.

The motion was stated by the president and carried.

Secretary Mahon read Section 2 of Article 7 and there being no objection the section was declared adopted by the president.

Secretary Mahon read Section 3 of Article 7 and there being no objection the section was declared adopted by the president.

Secretary Mahon read Section 4 of Article 7 and there being no objection the section was declared adopted by the president.

Secretary Mahon read Section 5 of Article 7 and there being no objection the section was declared adopted by the president.

Secretary Mahon read Section 6 of Article 7 and there being no objection the section was declared adopted by the president.

MR. GEORGE, OF SOUTH DAKOTA: I move the adoption of the whole of Article 7.

MR. RUSSELL, OF SOUTH DAKOTA: I second the motion.

The motion was stated by the president and carried.

Secretary Mahon read Section 1 of Article 8 of the proposed by-laws.

PRESIDENT RICHARDS: If there is no objection Section 1 will stand adopted.

Secretary Mahon read Section 2 of Article 8.

PRESIDENT RICHARDS: If there is no objection it will stand adopted.

Secretary Mahon read Section 1 of Article 9.

MR. BUCKLEY, OF MISSOURI: I would move you that this section be amended so as to read as follows: "The treasurer of this Congress shall give bonds for an amount to be determined by the board of directors of not less than five thousand dollars, said bond to be approved by the board of directors."

The motion was duly seconded, stated by the president and carried.

Secretary Mahon read Section 2 of Article 9.

PRESIDENT RICHARDS: There being no objection it is adopted. Secretary Mahon read Section 3 of Article 9.

PRESIDENT RICHARDS: There being no objection it is adopted. Secretary Mahon read Section 1 of Article 10.

There being no objection it was declared adopted by the president.

Secretary Mahon read Section 2 of Article 10.

There being no objection it was declared adopted by the president.

Secretary Mahon read Section 3 of Article 10.

There being no objection it was declared adopted by the president.

MR. HOLMES, OF MISSOURI: I do not understand that either Articles 9 and 10 have been adopted as a whole, and I would therefore move the adoption of Articles 9 and 10 as a whole.

The motion was seconded, stated by the president and carried.



Article 11 was read by the secretary, and there being no objection was declared adopted by the president.

Secretary Mahon read Section 1 of Article 12.

MR. RUSSELL, OF SOUTH DAKOTA: It seems to me that there might arise at some time in the sessions of the Congress a desire on the part of the Congress to defer a decision in selecting the place of the annual meeting and I would like to ask you whether this section would prevent the Congress from referring that matter to the board of directors, if at any time in the future it saw fit.

PRESIDENT RICHARDS: My understanding would be that whatever this Congress can do directly it can do indirectly in matters of that kind. Therefore I would assume that if they can vote directly for the place they can authorize the board of directors to select it.

PRESIDENT RICHARDS: If there is no objection Section 1 of Article 12 as read is declared adopted.

Secretary Mahon read Section 2 of Article 12.

PRESIDENT RICHARDS: If there is no objection Section 2 of Article 12 as read is declared adopted.

MR. GEORGE, OF SOUTH DAKOTA: I move that Article 12 be adopted as a whole.

Which motion was seconded, stated by the president and carried. Section 1 of Article 13 was read by Secretary Mahon.

PRESIDENT RICHARDS: The section will stand adopted, there being no objection.

Secretary Mahon read Section 2 of Article 13.

MR. HOLMES, OF MISSOURI: I move that this part of Section 2 of Article 13 be amended to read as follows: "The first day's session of this Congress shall be under the auspices and control of the local committee at the discretion of the board of directors."

Which motion was seconded, stated by the president and carried.

It was moved and seconded that Section 2 of Article 13 as amended be adopted, which motion was stated by the president and carried.

Secretary Mahon read Section 3 of Article 13.

It was moved and seconded that Section 3 of Article 13 be adopted, which motion was stated by the president and carried.

MR. GEORGE, OF SOUTH DAKOTA: I move that Article 13 be adopted as amended.

Which motion was seconded, stated by the president and carried.

Article 14 was read by the secretary and by the president declared adopted, there being no objection.

PRESIDENT RICHARDS: This closes the discussion of the by-laws section by section, except Article 4 and we are now ready to take that matter up.

PRESIDENT RICHARDS: While we are waiting I will state Congress instructed the chair to appoint five members to constitute a committee to have charge the next year of organizing local mining organizations in the various mining camps of the country and report this morning. In studying that matter over it was of so much importance to know who could serve and meet their expenses that the chair without intending to disobey your instructions, is not yet ready to report. I did not know but what we might find some means of meeting the expenses. For instance you might select one man to do that work and possibly make some provision for his expenses. I am not prepared as yet to select that committee to carry out the

best interests of the Congress and therefore I am not ready to report unless you so instruct and then, of course, I will gladly obey and do the best I can.

MR. BROWN, OF COLORADO: I would move that Article 4 be adopted as it is printed.

PRESIDENT RICHARDS: There has already been one amendment made substituting the word and figures "ten" (10) in place of the word and figures "fifteen" (15).

MR. BROWN, OF COLORADO: Then I move that the section be adopted as it is printed with the amendment.

The motion was seconded.

PRESIDENT RICHARDS: It has been moved and seconded that this section be adopted as amended.

MR. RUSSELL, OF SOUTH DAKOTA: I feel as I stated before that there should be no discrimination in this delegate representation. I feel that boards of trade, chambers of commerce, mayors of towns and county commissioners should be restricted even further. We want a representation from them, it is true, but I believe that the number of their delegates should be restricted to two instead of three. Then I believe that the mining organizations, whether they be mining men's associations or miners' unions or scientific associations, should be entitled to a larger delegation. I believe that we ought to maintain the delegate representation of this body. There is a danger if we cut our representation down too low in these matters that we will pass over completely along the lines of a scientific association and reach that line of work; we desire a delegate representation. Is there a motion before the house?

PRESIDENT RICHARDS: There is a motion before the house.

MR. CONZETTE, OF SOUTH DAKOTA: I desire to offer the following as an amendment to the proposed amendment, as follows: "And the mayors of cities or towns, boards of trade, boards of county commissioners, chambers of commerce and such other business organizations as may from time to time be designated by the executive committee, may each appoint two such delegates; scientific associations, mining bureaus, mining men's and miners' organizations shall be entitled to appoint five delegates and each delegate attending and properly accredited shall be entitled to participate in the deliberations of the Congress."

MR. MARTIN, OF SOUTH DAKOTA: I second the motion.

PRESIDENT RICHARDS: Now, in order that you may understand clearly the question to be voted upon, I will state it. It has been moved and seconded to adopt this section as amended. The amendment was in the fore part of the section by substituting "ten" in lieu of "fifteen." Now it is moved to amend that amendment so that it will read as follows: "And mayors of cities or towns, boards of trade, boards of county commissioners and such other business organizations as may from time to time be designated by the executive committee, may each appoint two such delegates and scientific associations, mining bureaus, mining men's and miners' organizations shall be entitled to appoint five delegates." Are you ready for the question?

MR. RUSSELL, OF SOUTH DAKOTA: Mr. Chairman, I do not wish to be on the floor all the time, but I would like to separate this question of representation from boards of trade, etc. from the question of the miners' representation. I think that the house is united



on part of that amendment and I would like to ask the author of the amendment whether he will not separate it in that way, so that they may be voted upon separately.

**PRESIDENT RICHARDS:** If there is no objection we will consider it separated into two motions and vote upon the first one now, which is: "And the mayors of cities or towns, boards of trade, boards of county commissioners and such other business organizations as may from time to time be designated by the executive committee may each appoint two such delegates."

**MR. PATTERSON, OF NEBRASKA:** Well, I am in favor of doing the thing to a finish when we get at it. I am in favor of striking out "mayors of cities or towns, boards of trade, boards of county commissioners, chambers of commerce" and not having a representation from them, and I make that as a motion.

**PRESIDENT RICHARDS:** The chair will be compelled to rule it out of order at this time.

**PRESIDENT RICHARDS:** The question now is to amend the amendment so as to read as follows: "And mayors of cities or towns, boards of trade, boards of county commissioners and such other business organizations as may from time to time be designated by the executive committee may each appoint two delegates."

**MR. BROWN OF COLORADO:** I rather insist that we should adopt this as it is printed. I find that there is a tendency for a good many men to come to these Congresses and to all public meetings that have no organization definitely arranged, to present the most extraordinary things. As a member of the resolutions committee of the Trans Mississippi Congress for several years, our principal business has been to turn down resolutions and this question is going to come up this way; we are drifting along towards socialistic lines in sections of the country.

**PRESIDENT RICHARDS:** Mr. Brown, the question is not pertinent to the one you are about to vote upon; it is proposed to reduce the representation of boards of county commissioners and so on from three to two.

**MR. BROWN, OF COLORADO:** Well, I am opposed to that.

**PRESIDENT RICHARDS:** Then confine yourself to the discussion of that.

**MR. BROWN, OF COLORADO:** These will be men representing the community and most likely a majority of them will be appointed in that way; in some of our great mining camps there are no miners' organizations or mining men's associations and there would be no delegation here at all in case you deprive the boards of county commissioners, mayors of cities and so forth, from appointing delegates to this Congress, so that the change that is recommended would be all wrong; it would take away the delegation from a great many mining camps by not allowing the mayors or commissioners to select a delegation to represent them. I think the article as printed is as it should be and the committee evidently has given a good deal of thought to this subject, and I move you that all amendments or proposed amendments be laid on the table.

The motion was seconded and carried.

**MR. LYNCH, OF MONTANA:** I believe that we have all been agreeing but not quite understanding each other in our amendments. I move you now that Article 4 be amended so as to insert the word and figure "two" (2) instead of the word and figure "three" (3).

MR. BROWN, OF COLORADO: I second the motion.

PRESIDENT RICHARDS: It has been moved and seconded to insert the word "two" and the figure "2" in lieu of the word "three" and the figure "3." Are you ready for the question?

MR. BUCKLEY, OF MISSOURI: I simply wish to say with regard to the delegate membership that I have always had a feeling, and I still maintain that feeling, that I believe was expressed in executive committee meeting, that it was hardly in keeping with the dignity, if I may use that word, of this American Mining Congress that we should request the mayors of cities or towns, boards of trade, boards of county commissioners or miners' organizations to appoint delegates; I believe that our delegate membership should come from county, state and territory and from bureaus of mines and mining, scientific organizations and mining men's associations, and I would therefore move you as an amendment to the amendment made by the gentleman from Montana that the words "and mayors of cities or towns, boards of trade, boards of county commissioners, chambers of commerce and miners' organizations" be stricken out of this article and there be added in lieu thereof "mining men's associations."

MR. PATTERSON, OF NEBRASKA: I second the amendment.

PRESIDENT RICHARDS: It has been moved and seconded that the amendment be amended to read as follows: "And the mayors of cities or towns, boards of trade, boards of county commissioners, miners' organizations and chambers of commerce" be stricken out and insert in lieu thereof "mining men's associations."

MR. RUSSELL, OF SOUTH DAKOTA: Mr. President, remembering the suggestion of the gentleman from Colorado that there are mining camps without mining men's associations, I desire to say I regret such a situation very much. I would like to see a mining men's association in every county, every section of the state and in every state, but it would seem to me that it would be right to render it impossible for those representative men interested actively as they are in mining, from obtaining some appointments, and if this power is taken away from the mayors, county commissioners, boards of trade and chambers of commerce entirely, that will be the result. Those people are entitled to their representation. Again, in cities like Omaha, St. Paul and other large cities there are many gentlemen very actively interested in mining; it might be they would not receive an appointment from the governor and there is no mining men's organizations or miners' unions in those cities; if they have no power to receive an appointment in this way they may not appear as a delegate and for reasons of their own they may choose to appear as a delegate rather than a member, and I am opposed positively and decidedly to taking away that power entirely from the mayors, boards of county commissioners and chambers of commerce. I would limit it to two, but I would not take it away entirely.

MR. BUCKLEY, OF MISSOURI: I would like to say that if there is a locality which is interested in mining it will be an incentive for them to organize a mining men's association so that they may have a representation at this Congress. They can at any time become a member of this organization if they are sufficiently interested in mining and have all the rights and privileges of membership, even if they are from St. Paul or any other city in the East or West.

MR. MARTIN, OF SOUTH DAKOTA: I am opposed to both of these amendments and if we are not intending to enlarge the representation from the strictly mining organizations or mining men, I am entirely in favor of the original motion which is to adopt the section as it now is amended, reducing the representations appointed



by governors to ten and leaving the balance of the section as it is. I have attended now three of these Congresses up to the present time; it has been entirely a delegate session. At the last meeting it was endeavored to give permanency to the organization by incorporation and adoption of by-laws, which we are now doing. Those engaged in that task realize it was vastly important to preserve in its broadest scope the delegate representation. The time may come when you have got sufficient men to come here, strictly from miners' organizations and to have no other representation at all, but thus far you have not been suffering by over representation of delegates. On the other hand, it is very important that delegates appointed by mayors, etc. should attend the Congress and come in contact with the active work. My observation from attending three sessions of the Congress is that we are more in need of enlarging our representation to this Congress than of decreasing it. I am, therefore, in favor of three delegates to be appointed by mayors, boards of trade, etc. as it has been and if I could increase it I would be in favor of doing so.

MR. DONALDSON, OF COLORADO: I am in favor of three at the present time. I wouldn't have been appointed if it had not been for the mining committee of the chamber of commerce, and the mining committee is annually appointed by the president of the chamber of commerce and that is the last we hear of it unless there is something like this comes up.

MR. SELBIE, OF SOUTH DAKOTA: It appears to me that since this Congress has been put on a corporate basis, that what we ought to do is to work up a large membership all over the United States and confine our representation to strict members of the Congress. I believe the Congress can be increased by proper effort all over the country and let our representation come from the members of Congress, not from the outside. I am in favor of confining it to members of this Congress and working up a large membership.

MR. GOODNER, OF WISCONSIN: Just as an example of the difference between the delegate system and the membership system, I want to state this, which is correct as far as my knowledge goes, that there were twenty-three delegates appointed from Wisconsin; of those twenty-three one person was already a member of this Congress; of the twenty-three so appointed but one person has attended the Congress and that one is the one who is already sufficiently interested to be a member.

MR. PATTERSON, OF NEBRASKA: It seems to me the proposition as I gather it is the stimulation of this Congress and to get that stimulation is the question. I contended this morning at the outset that we wanted to increase the dignity of this Congress and by so doing we wanted to increase the quality of the members that were nominated to come here and thereby reduce the quantity. I think I made the suggestion that we reduce the number from fifteen to ten and the Congress adopted the amendment. Now speaking about stimulation; if you ask every organization, state and town and everybody to send members here or delegates here, it is too common. People don't care to come; do you know you won't go where you are invited to go for nothing? If you put the price up to get into this hall at \$1.50 you will find the hall filled right from Lead here; they would think we have something to show. Don't make it so common that everybody can get in; let the man that has an interest here put up his five dollars and become a member and he will then feel some interest.

MR. GARBER, OF WASHINGTON: It seems to me, Mr. President, that the membership in the American Mining Congress comes very cheap when you can get it for a dollar. Any man that wants

to come to the American Mining Congress can have all the rights and privileges of a delegate to this Congress for the price of a dollar. I want to ask who has the most dignity, the man that comes to this Congress a representative of a board of commerce of his city or the man who reaches down in his pocket and pays his dues annually and comes in here; which is the least likely to be the representative man of his district? The chambers of commerce of this country have done more towards building up the mining industry of this country than any other organization probably in existence. Those men sit there day after day and night after night without pay, going without sleep, sending out literature of their districts and bringing immigration, capital and investment to their cities. Do you wish to bar chambers of commerce who are daily doing the work that this body seems to do for membership here. If you want to become an exclusive body, an exclusive four hundred if you please, I think, Mr. President, you are going to make a mistake. We cannot afford to ignore chambers of commerce and governors of states and executives of counties. There was even a motion made here to ignore the agricultural interests of this country a few minutes ago. Some have even intimated that no farmer was interested in mining stock. It might be so in some states, but in the state of Washington there is many a farmer who has enough gray matter up here in his cranium to invest in mining stocks. Now you are not overflooded here with delegates. It looks to me if you could take every chair in this hall, if you could fill that gallery and have no standing room, that the American Mining Congress would go up in the estimation of the world 50 per cent to say the least of it. Let us seek to bring representative men of the country to this Congress and the only way to get them is to get them through chambers of commerce, executives of cities and counties, because they will not appoint a man that is not a representative man to come here. A tramp might get in here for a dollar if you did not know his past record, but a man can't get an appointment from a chamber of commerce unless he has some one to recommend him.

**PRESIDENT RICHARDS:** The question now is with reference to the amendment to strike out the words "mayors of cities or towns, boards of trade, boards of county commissioners, chambers of commerce" and inserting the words "mining men's associations." Are you ready for the question?

The motion was lost.

**PRESIDENT RICHARDS:** It recurs now to the original motion to insert the figure and word "two" (2) in lieu of the word and figure "three" (3).

The motion was carried.

**PRESIDENT RICHARDS:** You will now vote on the motion to adopt the section as amended as a whole.

The motion was carried.

It was moved and seconded that the by-laws be adopted as amended as a whole, which motion was carried and the by-laws as amended were adopted.

**MR. THORNBY, OF SOUTH DAKOTA:** I move that we adjourn to 1:30, September 11th, 1903.

**MR. MARTIN, OF SOUTH DAKOTA:** Before that motion is put, I desire to state that the committee on resolutions have finished their work so far as the resolutions that have been referred to them are concerned, and will be ready to report at such time as Congress will be ready to receive their report.

Mr. Russell announced the program for the afternoon on behalf of Mr. Elder, the chairman of the program committee.

The motion to adjourn was carried and the meeting was adjourned until 1:30, September 11th, 1903.



## By-Laws of the American Mining Congress

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### OFFICERS.

Hon. J. H. Richards, President, Boise, Idaho.  
S. W. Russell, First Vice-President, Deadwood, S. D.  
E. R. Buckley, Second Vice-President, Rolla, Mo.  
Thomas Ewing, Third Vice-President, Los Angeles, Cal.

### EXECUTIVE COMMITTEE.

Hon. J. H. Richards, Boise, Idaho.  
S. W. Russell, Deadwood, S. D.  
E. R. Buckley, Rolla, Mo.  
Col. Thomas Ewing, Los Angeles, Cal.  
Irwin Mahon, Carlisle, Pa.  
Charles W. Goodale, Butte, Mont.  
J. Frank Watson, Oregon.  
W. L. Kendall, Cleveland, O.  
L. K. Armstrong, Spokane, Wash.

Submitted for approval by Executive Committee in session at  
Deadwood, South Dakota, December 17, 18 and 19, 1902.

J. H. RICHARDS, President.

IRWIN MAHON,  
Secretary of the Congress.

E. R. BUCKLEY,  
Secretary Executive Com.

## BY-LAWS.

### ARTICLE I.

#### NAME.

This organization shall be known as "The American Mining Congress."

### ARTICLE II.

#### OBJECTS.

This corporation is formed for the purpose of advancing the mining and metallurgical industries, in all their various branches, within the United States.

To assist in bringing about a more perfect co-operation between the government of the United States and the development of mining and metallurgy; to encourage education in practical and scientific mining and metallurgy and the dissemination of scientific information in relation to mining, metallurgy and their allied industries; to acquire and disseminate trustworthy information bearing upon the development of the metallic and non-metallic mining resources of the United States; to promote a more co-operative tendency in the evolution of agriculture, mining, manufacturing, transportation and commerce; and for the particular purpose of bringing the mining men of the United States into closer relation with one another, and of promoting a freindly feeling for one another through social intercourse and the discussion of mutual interests.

### ARTICLE III.

#### MEMBERSHIP.

Section 1. Any person actively associated with mining, who, after his application has been approved by the committee on membership, shall pay an initiation fee of five (\$5.00) dollars, shall become an active member of this Congress and thereafter he shall pay in advance an annual fee of two dollars (\$2.00) and shall vote and enjoy all other rights and privileges usual to members.

Section 2. Any person entitled to active membership in this Congress may, upon the payment of fifty dollars (\$50.00), become a life member, and shall, without the payment of further annual dues, be entitled to all the rights and privileges of active membership.

Section 3. Any person actively associated with mining, with the approval of the committee on membership, shall, upon the payment of a fee of one dollar (\$1.00) per annum, become an associate member of this Congress, and shall be entitled to attend the sessions and participate in the deliberations of the Congress, but shall not be entitled to vote or hold office.

Section 4. Honorary membership may be conferred upon each persons as this Congress shall deem worthy of such distinction.



Honorary members may be elected at any regular meeting of the Congress upon the recommendation of the committee on membership and the approval of the board of directors.

Section 5. No person who shall comply with the requirements of this article shall be denied membership to this Congress.

#### ARTICLE IV.

##### DELEGATES.

A chief executive of any country, state or territory may appoint as delegates to any annual session of this Congress, fifteen (15) persons actively associated with mining; and the mayors of cities or towns, boards of trade, boards of county commissioners, scientific associations, miners' organizations, mining bureaus, chambers of commerce, and such other business organizations as may from time to time be designated by the executive committee, may each appoint three such delegates, and each delegate, attending properly accredited shall be entitled to participate in the deliberations of the Congress.

#### ARTICLE V.

##### DUES.

Life members shall pay a fee of fifty (\$50.00) dollars; members, an initiation fee of five (\$5.00) dollars and annual dues of two (\$2.00) dollars; associate members, annual dues of one (\$1.00) dollar; and delegates, nothing.

#### ARTICLE VI.

##### OFFICERS.

Section 1. The government and management of the Congress shall be committed, first, to a board of directors of nine members, to be elected annually by the Congress; second, to a president and three vice-presidents, to be elected by the board of directors from its members; and, third, to a secretary and treasurer, to be chosen by the board of directors.

Section 2. It shall be the duty of the board of directors to annually elect as president, vice-presidents, secretary, and treasurer, such persons as may be recommended by the Congress.

Section 3. For the purpose of facilitating the selection of officers, there shall be annually elected by the Congress at its second day's session, a committee of five members to be known as a nominating committee, whose duty it shall be to present to the Congress for its consideration the names of such persons as such committee may deem advisable to act as directors and officers of the Congress for the ensuing year.

#### ARTICLE VII.

##### DUTIES OF OFFICERS.

Section 1. The board of directors shall have power to do every act and thing which the business interests of the Congress may require except to amend or repeal these by-laws, but nothing in these by-laws shall give the board of directors the right to do any act or thing that is contrary to any motion or resolution adopted at any previous meeting of the Congress or that is contrary to any of the provisions of the charter of this Congress or of the by-laws. No person shall be eligible to be a member of the board of directors or to hold any other office in this Congress, except an active member of this association in good standing.

Section 2. A vacancy occurring in an office or in the board of directors shall be filled by the remaining members of the board, and the officer or member of the board so elected shall hold office until the next annual meeting or until his successor is elected.

Section 3. The president shall preside at all meetings of the Congress and of the board of directors and shall enforce all the laws the regulations of the Congress. At the annual meeting of the Congress he shall report for the board of directors upon its proceedings during the year and recommend such measures as the board may deem advisable.

Section 4. In the absence of the president, the first vice-president shall perform his duties; in the absence of both president and first vice-president, the second vice-president shall perform the duties of the office; in the absence of the president and first and second vice-presidents, the third vice-president shall preside and perform the duties of the office; and in the absence of the president and vice presidents, the board of directors may select a chairman from its members.

Section 5. The secretary shall conduct all of the official correspondence of the Congress. He shall keep a record of all meetings and proceedings of the Congress and the board of directors; shall collect all moneys due to the Congress, receipt for and transmit the same to the treasurer; and shall perform such other duties as may be assigned to him by these by-laws, by the Congress or by the board. At the annual meeting he shall report in detail upon the membership and condition of the Congress.

Section 6. The treasurer shall receive all moneys from the secretary, pay all bills as directed by the president and countersigned by the secretary and keep proper vouchers for all payments. He shall, at each meeting of the board of directors, present a statement of the financial condition of the Congress and shall at the annual meeting submit a detailed report, approved by the finance committee; and the said statement and reports shall, at all times after their presentation or submission, be open to the inspection of any of the members of the Congress.

## ARTICLE VIII.

### COMMITTEES.

Section 1. The following additional committees shall be elected by the board of directors:

An advisory committee, to be composed of one member from each state.

A committee on legislation, of five members.

A committee on membership, of seven members;

A committee on transportation, of five members;

A committee on auditing and finance, of five members;

A committee on program of five members, to which committee each paper to be presented before any meeting of the Congress shall be submitted for approval in advance of said meeting, except such papers as may be presented on invitation of the program committee.

Section 2. The president shall appoint annually, a committee on credentials of three members, and a committee on resolutions of twenty members. The names of the members comprising these committees shall be in the hands of the secretary at the opening of each session of Congress.



## ARTICLE IX.

## BONDS OF OFFICERS.

Section 1. The treasurer of this Congress shall give bond for an amount to be determined by the executive committee, of not less than five thousand (\$5,000.00) dollars; said bond to be approved by the executive committee.

Section 2. The secretary shall give such bond as may be required by the board of directors, not less than one thousand (\$1,000) dollars.

Section 3. Bond fees of the treasurer and secretary shall be paid by the Congress.

## ARTICLE X.

## PUBLICATIONS.

Section 1. There shall be published annually a report of the proceedings of this Congress, including such papers, presented at the annual session, as may be approved by the program committee, and a list of the names, occupation and address of all members and delegates.

Section 2. The board of directors shall have the proceedings of each session copyrighted.

Section 3. All members and delegates shall be entitled to a copy of the proceedings of each annual session covered by their dues.

## ARTICLE XI.

## RESOLUTIONS.

All resolutions shall be submitted to the secretary in writing, read by him before the Congress and referred to the committee on resolutions for consideration and recommendations.

## ARTICLE XII.

## TIME AND PLACE OF HOLDING ANNUAL SESSION.

Section 1. The place of holding the annual session shall be determined by the Congress.

Section 2. The time of holding the annual meeting shall be determined by the board of directors.

## ARTICLE XIII.

## ORDER OF PROCEEDINGS.

Section 1. The sessions of this Congress shall be governed by Roberts' Rules of Order.

Section 2. The first day's session of this Congress shall be under the auspices and control of the local committee. The order of business for the remaining sessions shall be as follows:

1. Report of committee on credentials.
2. Unfinished business.
3. New business.
4. Reading of resolutions.
5. Reports of committees.
6. Addresses and papers.
7. Adjournment.

Section 3. The selection of a place of holding the next session of the Congress shall be a special order for 2 o'clock on the afternoon of the last day. This shall be followed by the election of the board of directors and the adoption of a resolution addressed to the board of directors naming those to be elected by the board as officers of the Congress for the ensuing year.

#### ARTICLE XIV.

#### : AMENDMENTS.

These by-laws may be amended by a two-thirds vote of the members present upon twenty-four hours' notice in writing containing the amendment proposed.

Lead, South Dakota, September 11th, 1903, 1:30 P. M.

PRESIDENT RICHARDS: Congress will be in order.

PRESIDENT RICHARDS: We will now hear the report from the committee on resolutions.

MR. MARTIN, OF SOUTH DAKOTA: Mr. President, the committee on resolutions have considered the various resolutions referred to it by the Congress and will report them in order. As to the following resolution introduced by Mr. Ed. F. Browne, the committee recommends its adoption by the Congress:

#### RESOLUTION CALLING FOR THE ESTABLISHMENT OF A DEPARTMENT OF MINING.

Resolved, That we call upon congress to pass the necessary legislation that would create a Department of Mining along the same lines as the Agriculture Department is at present established.

That this department be made one of the executive departments of the government, with a member of the cabinet at its head.

It was moved by Mr. Browne, of Colorado, and seconded by Mr. Patterson, of Nebraska, that the resolution be adopted, which motion was carried.

MR. MARTIN, OF SOUTH DAKOTA: The committee also recommends the adoption of the following resolution relative to the mineral statistics:

#### RESOLUTION RELATIVE TO THE COLLECTION OF MINERAL STATISTICS.

To the President:

The members of the American Mining Congress realize that the mineral statistics of the country can be intelligently and accurately collected only by persons familiar with mineral and mining conditions; and they believe that the work of government in relation to mining interests should be concentrated and strengthened, and not weakened by the separation in integral parts, and,

Whereas, it has been proposed that the president of the United States, acting under the authority recently conferred upon him by congress, should remove from the geological survey the work of collecting the mineral statistics of the country and transfer the same to the newly established Department of Commerce; it is therefore

Resolved, That the American Mining Congress respectfully petitions the president that he permit the collection of mineral statistics to remain a part of the work of the geological survey; and further,

Resolved, That this Mining Congress asks the president to use his influence to so strengthen and enlarge the work of this branch of



the government service that it may the better meet the various needs of our rapidly growing and complex mining industry.

It was moved by Mr. Brown, of Colorado, and duly seconded that the resolution be adopted, which motion was carried.

MR. MARTIN, OF SOUTH DAKOTA: The committee also recommends the adoption of the following resolution:

Whereas, in the report of the Treasury Department giving the classification of exports for 1902-1903 the following audits were given the different industries, viz.:

Agriculture .....	\$873,285,142	62.72 per cent.
Manufactures .....	408,187,207	29.32 per cent.
Mining .....	38,814,759	2.79 per cent.
Forest .....	57,830,778	4.15 per cent.
Fishery .....	7,755,232	.56 per cent.
Miscellaneous .....	6,328,579	.46 per cent.
	<hr/>	
	\$1,392,201,637	100.00 per cent.

And in the same report the following articles are specified as having been exported:

Brick .....	\$ 429,908
Cement .....	419,351
Coal .....	21,206,498
Coke .....	1,912,459
Copper ore .....	927,417
Copper ingots and bars .....	37,356,061
Phosphates .....	6,344,224
Iron ore .....	266,982
Pig iron .....	362,068
Ingots and blooms .....	68,064
Lead pigs and bars .....	15,527
Lime .....	32,694
Marble, stone and slate .....	1,565,244
Nickle and matte .....	864,221
Mineral oil .....	6,329,899
Mineral oil refined .....	60,357,519
Mineral residium .....	566,115
Quicksilver .....	762,201
Salt .....	70,446
Zinc .....	1,386,694
	<hr/>
	\$141,241,602

And whereas, it is evident that all of the foregoing items should have been credited to the exports of mining product and not to manufactures, thus making the amount of mining products exported read \$141,241,602 instead of \$38,814,759 or 10.15 per cent of the aggregate of articles exported instead of 2.79 as reported, it is

Resolved, that this Mining Congress calls attention of the statisticians at Washington to the fact that great quantities of the production of mines, through an error, is being credited to exports of manufactures, and that we earnestly request that a change be made which will allow our official statistics to credit to the mining industry these products which are directly the result of mining.

It was moved by Mr. Patterson, of Nebraska, and duly seconded that the resolution be adopted, which motion was carried.

MR. MARTIN, OF SOUTH DAKOTA: The next is a resolution asking the congress of the United States to enact a law to establish mining experimental stations to aid in the development of the mineral resources of the United States and for other purposes. Upon the

back of this resolution is an endorsement: "To establish mining experiment stations to aid in development of the mineral resources of the United States, and for other purposes," in the form of a legislative act, introduced by James A. George. The committee entirely favored the purposes of the proposed bill and have prepared what they recommend as a substitute resolution, embodying practically the form of the resolution with a little addition, expressive of the purposes of the bill, but without going into the details of the bill in its entirety in the report.

The following is the resolution submitted and following that is the resolution proposed by the committee:

#### SUBSTITUTE RESOLUTION.

Resolved, That the congress of the United States be asked to enact a law to establish mining experiment stations in the various mining states of the union to aid in the development of the mineral resources of the United States, the benefits of which shall be gratuitously furnished to prospectors and others engaged in the discovery and development of mines.

The resolution submitted by the committee on resolutions was adopted.

MR. MARTIN, OF SOUTH DAKOTA: The following resolution upon the subject of improved roads is also recommended by the committee on resolutions:

#### RESOLUTION.

Recognizing that properly constructed highways are vitally important to the highest development of the mining industry and believing that the state and the nation which share in the benefits should contribute their equitable proportion of the cost; therefore, be it

Resolved by the American Mining Congress in convention assembled at the cities of Deadwood and Lead, S. D., that we emphatically approve a system of highway improvement under competent engineering supervision, embodying the general principles of state aid, now successfully practiced in many of the older states; and that we believe that the general government ought in equity to assume its pro rata of the burden of cost; and we request the active support of our representatives in congress for this policy.

JAMES W. ABBOTT,

It was moved by Mr. Patterson, of Nebraska, and seconded by Col. Ewing, of California, that the resolution be adopted, which motion was carried.

MR. MARTIN, OF SOUTH DAKOTA: The adoption of the following resolution is recommended:

#### RESOLUTION AS TO MINERALIZED TIMBER LANDS.

It is hereby resolved by the American Mining Congress in convention assembled, at Deadwood and Lead, South Dakota, in the year A. D. 1903, that, whereas,

Under what is known as the Timber and Stone Act, a statute of the United States meritorious in itself for the purpose for which it was enacted, great abuses of the privileges granted thereby are being constantly practiced by many of those who are availing themselves of its benefits in that in the mining states and territories vast tracts of land are being secured by timber speculators and syndicates in the very heart of the various mineral sections, some of which tracts are known to be mineral in character, and other tracts are so situated with reference to known mineral lands as to create a positive conclusion that they too are mineral lands, and, whereas,



Under the land grants by the United States government to territories at the time of their admission into the union as states, more or less of such timber lands are granted to such new states by right of selection, which are afterwards sold to said timber speculators by the states, and, whereas,

Said practices are daily withdrawing from the people their heritage of undeveloped mineral wealth, vesting the same at a nominal price, in great syndicates not identified with the mining industry, and in whose possession such lands are likely to remain after the removal of the timber therefrom for an unknown period of time, without development of the mineral possibilities therein, to the serious detriment of the mining industry and of commerce, and greatly curtailing the natural limit of the mining field as created by nature.

Now, therefore, we hereby declare that this Congress views with alarm the said practices and subversion of the law from its real and beneficent intent to selfish and speculative designs, detrimental to the mining industry and the public welfare, and hereby petition the congress of the United States at its earliest convenience to make such enactments of United States law, that all United States grants, or sales of timber or stone lands in the mining states and territories, whether to states, territories, individuals or corporations, shall provide that the purchaser or grantee only shall have the right to remove timber or stone from such lands, all mineral rights to be reserved to the United States government together with such lands, the same to be disposed of to the mineral claimant, and subject to the prospecting rights as other mineral lands of the United States, subject only to the right of the grantee or purchaser, by other than the mining acts, to remove the timber or stone for which the grantee or purchaser secured such timber or stone lands.

It was moved by Mr. Patterson, of Nebraska, seconded by Mr. Ewing, of California, that the resolution be adopted, which motion was carried.

**MR. MARTIN, OF SOUTH DAKOTA:** The following resolution is proposed for adoption:

To the President of the Senate and to the Speaker of the House of Representatives, Washington:

In view of the incalculable benefits to agriculture that have come from the establishment of agricultural schools and experimental stations, and,

In view of the increasing importance and complexity of the mining interests as the other basal industry of the country;

Resolved, That the American Mining Congress respectfully petitions the congress of the United States to provide for the maintenance of one or more institutions in each state and territory, the purpose of which shall be the giving of instruction in subjects relating to mining and metallurgy, and for carrying on investigations in these subjects.

It was moved by Mr. Patterson, of Nebraska, seconded by Mr. Ewing, of California, that the resolution be adopted, which motion was carried.

**MR. MARTIN, OF SOUTH DAKOTA:** The following resolution as amended is proposed for adoption:

"Resolved, That the American Mining Congress, assembled in Deadwood and Lead City, protests against any legislation by this country tending to further restrict the use of silver as real money or to depress its value upon the market."

**MR. CONZETTE, OF SOUTH DAKOTA:** I accept the amendment. The resolution upon motion duly seconded was adopted.

MR. MARTIN, OF SOUTH DAKOTA: The following resolution, with one modification which I will refer to, is recommended for adoption: "That a committee of five of our active members be selected by our chair to form a law to derive means by which suitable men be employed to visit all mining camps and organize local mining organizations to co-operate with this Congress in obtaining paid members." The words that we recommend to be omitted from the resolution are "to form a law." It seemed to the committee that the words "to form a law" would not add to the strength of the resolution.

MR. DIGNOWITY, OF PENNSYLVANIA: I accept the amendment and move its adoption.

The following is the resolution:

Resolved, That a committee of five of our active members be selected by our chair to devise means by which suitable men be employed to visit all mining camps and organize local mining organizations to co-operate with this Congress in obtaining paid members.

PRESIDENT RICHARDS: I do not know what provision you are going to make yet, or what we can make for that committee. I do not know myself what that committee should be composed of, whether one or more; it would depend upon the amount of money you have. As to the question of the number of that committee I do not know what is best. It strikes me that if you make it five and only have money enough for one, that it is hardly proper, and perhaps it might be well to let the executive committee or board of directors determine the number in proportion to the money they have to expend. I only say this as a suggestion.

MR. BUCKLEY, OF MISSOURI: I have given that matter a little thought since talking the matter over with you yesterday and I feel that this committee should be the advisory committee of the American Mining Congress; that in reality we should make a member and every member of the advisory committee a member of this committee, that would mean one man for each state in the union. I do not believe that we are going to have sufficient funds to pay the expenses of any committee to go through the United States to carry on this work and I think if the executive committee are careful in the selection of their advisory committee, this committee might perform those duties.

The resolution upon motion, duly seconded, adopted.

MR. MARTIN, OF SOUTH DAKOTA: The following resolution has been under consideration by the committee: "Resolution favoring home rule and statehood for the territories of Arizona, Oklahoma and New Mexico. Resolved that we favor home rule for, and the immediate admission into the union as states, the territories of Arizona, Oklahoma and New Mexico."

#### RESOLUTION FAVORING HOME RULE AND STATEHOOD FOR THE TERRITORIES OF ARIZONA, OKLAHOMA AND NEW MEXICO.

Resolved, That we favor home rule for, and the immediate admission into union as states, the territories of Arizona, Oklahoma and New Mexico.

So far as personal opinions expressed by the members of the committee are concerned, I think the committee practically is entirely unanimous in favor of the admission of these territories, but it has seemed to the committee that this resolution is not within the purposes of the rule of our by-laws and the committee therefore reports back this resolution without acting as not within the purposes of the Congress.



The resolution was not acted upon by the Congress.

The following resolution was recommended by the resolution committee and adopted by the Congress:

Whereas, one of the most important achievements in the history of the government of the United States was consummated in the year 1805, by the peaceful occupation of the great Pacific Northwest, then and long afterward known as the "Oregon Territory," by the expedition sent by President Thomas Jefferson, and headed by Captains Merriweather Lewis and William Clark, and,

Whereas, the acquisition of the said "Oregon Territory," comprising the present states of Oregon, Washington and Idaho, and part of Montana, Wyoming and Dakota, extended the domain of the United States, from the western boundary of the then recent "Louisiana Purchase" to the Pacific ocean, thereby compassing the continent from the Atlantic to the Pacific seas, and,

Whereas, the possession of the "Oregon Territory" rendered the acquisition of other contiguous territory possible and inevitable, and,

Whereas, the world's commerce, industries, finance and policies have been revived and improved, and our own government mightily strengthened to the accomplishment of a matchless destiny through the great volume of valuable metals, digged from the mines and the fields of those vast domains, and,

Whereas, the industry of mines in the United States is as potential for good as ever heretofore; and,

Whereas, on being informed of a desire on the part of the people of the Pacific West to appropriately mark and celebrate the centennial anniversary of the unequalled achievement of Captains Lewis and Clark in leading the willing feet of Columbia to the verge of the sunset sea this Congress at its last annual session, by appropriate resolution, unanimously adopted, approved such patriotic endeavor and pledged co-operation and support of the organization and its members; and,

Whereas, since said approval and endorsement by this Congress, strong organizations have been perfected, and moneys appropriated and subscribed, by the legislature of the state of Oregon and by voluntary subscription by her citizens, for the purpose of honoring said centennial anniversary in 1905, by a great exposition to be held in Portland, near the point where the valiant captains reached the Pacific; and,

Whereas, several of the legislatures of the Rocky Mountain and Pacific states have recently endorsed said proposed exposition and contributed moneys for the purpose of participating therein.

Now, Therefore, Be It Resolved, That this Congress in sixth annual convention assembled, renews its approval of the purpose and endeavor to celebrate the epoch in American history, popularly known as the Lewis and Clark expedition across the continent and completed in 1805.

Resolved, That this Congress as a body and its members as individuals pledge support and participation in such exposition.

Resolved, That this Congress is of opinion that all the mining states, particularly those in all the region of the Rocky Mountains to the Pacific sea and from Canada to Mexico, should seize hold of this first opportunity to make a full exposition of the mining industry and its products, and every effort made to instruct the people in the importance, extent, progress and present status of this great industry and its relations to the progress of the world.

The following resolution was recommended by the resolution committee and adopted by the Congress:

Resolved, That the American Mining Congress is against fake mining companies and the exploitation of mining stock based solely upon options for the purchase or levies of mining property, and that we call upon the legislators of the several states and territories of the

United States to pass such legislation as may be effectual to remedy the evil here mentioned, thus protecting alike investors and legitimate mining enterprises.

The following resolution was recommended by the resolution committee and adopted by the Congress:

Resolved, That we view with approbation the purchase of silver by the government in the open market and their co-operation with the committee appointed by the Mexican government to secure a staple value and world wide market for silver by the co-operation of all the staple governments of the world.

MR. MARTIN, OF SOUTH DAKOTA: One of the subjects we have had under consideration is a document entitled "A Solution of Our Interests in Money" and the sub committee of the general committee on resolutions went through this document with care and made report to the committee in session, the result of which is that the committee report to the Congress presenting this resolution back with the statement that in the view of the members of the committee it does not come within the purposes and intent of this organization as defined by its by-laws.

The following is the resolution:

A SOLUTION OF OUR INTERESTS IN MONEY.  
CONFIDENTIAL.

Chas. Albert Long, Pomeroÿ, Washington.

AN ACT.

Entitled an Act:—

To revise the present monetary measure and system of the United States of America and Territories to accord and comply with the fundamental principles of money itself and provide:—

First—For a money and a monetary system of a definite standard.

Second—To provide for a subsidiary coin and currency of identical and of inseparable representative value of the primary without liability or loss to the government.

Third—To provide for the free and unlimited use of all money metals and thereby permit our people the right and privilege of providing themselves with the greatest possible volume of money.

Fourth—To place our money metals in the care and keeping of the government and provide for their most economic and for their most efficient public use.

Fifth—To provide for the liquidation of our interest-bearing bonds and to forever place the government above having again to borrow.

Sixth—To relieve the government from the present burden and expense of circulation.

Seventh—To dispense with endless redemption.

Eighth—To relieve the government from all unnecessary coinage, and especially from the useless and senseless coinage of silver dollars which will not now circulate, and never will.

Ninth—To provide a national banking system which will insure depositors against loss in the event of failure or of suspension without immediate liquidation.

Tenth—To provide our national banks with government protection from depositor's panic.

Eleventh—To provide for an elastic emergency currency.



Twelfth—To provide for a separate coloring for each kind of currency and for a separate design for each denomination of every kind, and for other purposes, and especially to invite the whole world to unite in the adoption of a universal standard of money, and the provision of a coin currency of identical parity for every nation.

#### EXAMPLE.

#### ARTICLE FIRST.

##### STANDARD OF VALUE.

Section 1st. Resolved and be it enacted by the Senate and House of Representatives of the United States of America Assembled in Session of the Fifty-eighth Congress:—

That on and after the Fourth day of July, A. D., 1904, the legal standard measure of all values within these United States and Territories shall be and consist of gold coin of the United States of America.

Section 2nd. That on and after the said Fourth day of July, A. D., 1904, the legal unit measure of all value within these United States and Territories shall be and consist of the gold dollar of the United States of America.

Section 3rd. That the gold dollar of the United States of America shall be and consist of 23 22-100 grains troy weight of pure gold and shall be coined in denomination of \$100, \$200, \$500, and \$1000.

Section 4th. That gold coin of the United States of America shall be and consist of pure gold — 1000ths and of alloy — 1000ths, composed as follows, to wit:—

#### ARTICLE SECOND.

##### COINAGE.

Section 1st. That if any person or persons, corporation or association, shall deliver and deposit to the credit of the United States of America at our treasury, or any sub-treasury, or any mint, or at any national bank of these United States or Territories, pure gold of the weight and measure of 2322 grains troy weight, or any multiple thereof, or shall so deliver and deposit gold coin of the United States of America, and of legal weight, in amounts of one hundred dollars or any multiple thereof, or shall so deliver and deposit other coin containing pure gold of the weight and measure of 2322 grains troy weight, or any multiple thereof, or shall so deliver and deposit United States notes of present issue, in amounts of one hundred dollars, or any multiple thereof, such depositors shall be entitled to and may receive therefor at our nearest mint gold coin of the United States of America in denominations of \$100, \$200, \$500, or \$1000, as hereinafter provided—a legal tender for all dues and demands, public and private (and the legal standard measure of all values within these United States and Territories), or in lieu thereof such depositors shall be entitled to and may receive therefor at our nearest mint gold certificates of the United States of America in denominations of \$100, \$200, \$500, or \$1000, a legal tender for all dues and demands, public and private, receivable for all dues of government and redeemable upon presentation and demand at the treasury, or at any sub-treasury, or at any mint of the United States in the gold coin of the United States of America, or in pure gold, or in pure platinum, or in pure silver, of the approximate value of the gold coin of the United States of America, at the option of the secretary of the treasury.

Section 2nd. That if any person or persons, corporation or association, shall deliver and deposit to the credit of the United States of America at the treasury, or any sub-treasury, or at any mint, or at

any national bank, of these United States or Territories, pure platinum of the approximate value of fifty gold dollars of the United States of America, or any multiple thereof, such depositors shall be entitled to and may receive therefor at our nearest mint, platinum coin of the United States of America, in denomination of fifty dollars, of any weight and composition of alloy congress may hereinafter adopt, a legal tender for all dues and demands, public and private, to any amount not exceeding one hundred dollars, or in lieu thereof, such depositors shall be entitled to and may receive therefor, at our nearest mint platinum certificates of the United States of America in denominations of fifty dollars, a legal tender for all dues and demands, public and private, receivable for all dues of government, and redeemable upon presentation and demand in amounts of one hundred dollars, or any multiple thereof, at our treasury, or at any sub-treasury, or at any mint of the United States, in gold coin of the United States of America, or in pure gold, or in pure platinum, or in pure silver, of the approximate value of gold coin of the United States of America, at the option of the secretary of the treasury.

Section 3rd. That if any person or persons, corporation or association, shall deliver and deposit to the credit of the United States of America at our treasury, or at any sub-treasury, or at any mint, or at any national bank of these United States or Territories, pure silver of the approximate value of one gold dollar of the United States of America, or any multiple or fraction thereof, or shall so deliver and deposit United States silver dollars of present issue, or silver certificates, or coin certificates, or treasury notes, or other demand obligations of these United States, in any amount, or shall so deliver and deposit interest-bearing bonds of the United States of America at their market value, or shall so deliver and deposit national bank currency of the United States of America, in any amount, or shall so deliver and deposit pure gold, or gold coin, or gold certificates, or pure platinum, or platinum coin, or platinum certificates of the United States of America in any amount, such depositors shall be entitled to and may receive therefor at our nearest mint, silver coin of the United States of America, in denominations of half-dollars, quarter-dollars, dimes or half-dimes, each and all of the weight and fineness congress may herein or hereafter adopt, a legal tender for all dues and demands, public and private, to any amount not exceeding twenty-five dollars for half-dollars, or ten dollars for quarter-dollars, or of one dollar for dimes, or of one half-dollar for half-dimes, or in lieu thereof, such depositors shall be entitled to and may receive therefor at our nearest mint, minor coins of the United States of America, in denominations of three cents or of one cent, of any metal, size and design congress may adopt, a legal tender for any amount not exceeding one dime for both, or in lieu thereof such depositors shall be entitled to and may receive therefor at our nearest mint, silver certificates of the United States of America in denominations of \$1, \$2, \$5, \$10 or \$20, a legal tender for all dues and demands, public and private, receivable for all dues of government and redeemable upon presentation and demand in amounts of \$100, or any multiple thereof, at our treasury, or any sub-treasury, or at any mint of the United States, in gold coin of the United States of America, or in pure gold, or in pure platinum, or in pure silver of the approximate value of gold coin of the United States of America, at the option of the secretary of the treasury.

### ARTICLE THIRD.

#### REDEMPTION OF MONEY METALS.

Section 1st. That all money metals received by the United States of America at any bank, as provided in this act, shall always be subject to the actual expense of transmission, including insurance of delivery at our nearest mint.



Section 2nd. That all gold bullion or gold coin received as bullion by the United States of America, under the provisions of this act shall always be subject to a charge of the actual cost to government of the alloy necessary to effect its coinage.

#### ARTICLE FOURTH.

##### APPROXIMATING THE VALUE OF MONEY METALS.

Section 1st. That the value of all subsidiary money metals received by the United States of America, under the provisions of this act, and the value of all money metals disbursed by the United States of America, under the provisions of this act, shall always be reckoned at the highest price quoted in open market, or, if special bid be asked, and which shall obtain if more than \$10,000 be offered, shall always be reckoned at the highest price bid in gold coin of the United States of America for the amount offered, at the nearest exchange to the place of offering.

Section 2nd. That it shall always be the option, privilege and duty of the secretary of the treasury to either accept or to reject, in the interest of government, any and all bids for money metals deposited to the credit of, or being offered on disbursement by the United States of America.

#### ARTICLE FIVE.

##### ALLOY OF COIN AND DESIGN OF CURRENCY.

Section 1st. That the secretary of treasury is hereby authorized and requested to appoint a committee of one or more (as in his discretion may seem necessary) to determine, if possible, the most practical design of coin and composition of alloy necessary to render all coin issued under the provisions of this act the least susceptible to wear and waste by abrasion, and the secretary of treasury is hereby authorized and requested to pay all legitimate expense incurred by such commissions out of any credits of the public treasury and charge the same to the account of design and coinage.

Section 2nd. That each kind of currency hereafter issued by the United States of America (as hereinbefore provided) shall be of a distinct and separate coloring, and that each denomination of every kind shall be of a distinct and separate design, so that each kind and each denomination of every kind may be readily discernible from both design and coloring, and the secretary of treasury is hereby authorized and requested to appoint a commission of one or more, as in his discretion may seem necessary, to determine, if possible, the most desirable size, design and coloring of each respective kind of currency, and for their several denominations, as hereinbefore provided, and to pay the expense incurred by such commission out of the public treasury and charge the same to the account of designing of currency.

#### ARTICLE SIXTH.

##### RETIREMENT OF PRESENT ISSUE.

Section 1st. That it shall be unlawful and a misdemeanor for any person or persons, corporation or association, to pay or to offer in payment, or to circulate or to offer in circulation, on or after the First day of January, A. D., 1905, any other coin or currency than as hereinbefore provided for (except national bank currency) and that every person or persons, corporation or association, having United States of America's coin of present issue (except national bank currency) and wishing to obtain money or lawful subsidiary coin or currency therefor shall, before the said First day of January, A. D., 1905, present the same at some United States depository for exchange in

coin or currency of the United States of America, as hereinbefore provided for, and any violation of this act shall render the offender liable to a fine of not less than 10 per cent of the amount so offered.

Section 2nd. That the secretary of treasury shall provide each national bank, express paid, with whatever kind of coin and currency hereinbefore provided for, which the public may require in exchange for their present issue, and charge the expense of such expressage to the account of retirement of present issue.

#### ARTICLE SEVENTH.

##### DIVISION OF TREASURY'S CREDITS.

Section 1st. That all accounts in relation to the reception and disbursements of money metals, and all accounts in relation to the issue and redemption of currency, shall be kept separate and apart from all other accounts and transactions of the treasury, and in a department to be known as the Department of Issue and Redemption, and to which all gold and gold coin, and all platinum and all silver bullion, and silver dollars of present issue, now in possession of the government, or which may hereafter be received or acquired in payment of any dues, or otherwise, shall be accredited in exchange for currency. and all of said coin shall be reduced to bullion and recoined as fast, if possible, as the demands of the public may require, in gold, platinum, or silver coins of the kind and denomination hereinbefore provided for, or currency may be issued in lieu thereof to suit the demands of the public, but that no issue of permanent or regular currency, except as hereinbefore provided for, shall ever be without a direct and specific act of congress authorizing such excessive issue.

#### ARTICLE EIGHTH.

##### NATIONAL BANK GUARANTEE FUND.

Section 1st. That all national banks now existing, or which may hereafter be authorized by the United States of America, shall in addition to all other acts of regulation and supervision be subject to an annual tax of 1-10 of 1 per cent of their respective loans and discounts which shall be paid to the secretary of treasury in quarterly installments, beginning with the Fourth day of July, A. D., 1904, and being reckoned upon the monthly average of their respective loans and discounts for the three preceding months and becoming perpetually due and payable upon the fourth day of every third month thereafter, the proceeds of which shall be accredited to a fund to be known as the National Bank Guarantee Fund, the intent and purpose of which shall be to guarantee the prompt and certain payment of all national bank deposits, and which shall be kept distinct and separate from all other money and accounts in the care and keeping of the secretary of treasury, and used only to pay depositors of national banks in the event of their failure or of suspension without immediate liquidation and adjustment of all deposits, and in the event of such failure the secretary of treasury shall, as soon as possible, ascertain such bank depositors due, and issue to each a certificate of United States deposit, payable to order upon endorsement, and such claims against any bank shall be a first lien upon all assets of whatever nature and kind, due or belonging to any such bank, and upon all of the lawful obligations of the respective stockholders, and in the event of the National Bank Guarantee Fund ever becoming insufficient of meeting the demands of failing bank depositors, then each and every national bank shall be subject to an emergency assessment equal to their proportion of the amount then due such depositors.

Section 2nd. That all national banks of the United States of America may continue, and all other banks of these United States and Territories may hereafter organize and continue as national banks with-



out a deposit of government bonds by simply subscribing to the National Bank Guarantee Fund, as hereinafter provided for, and by complying with all other lawful requirements of national banks of the United States of America.

## ARTICLE NINTH.

### EMERGENCY CURRENCY.

Section 1st. That any national bank of the United States of America in good standing and holding a lawful reserve, may, upon application to and recommendation by the comptroller of currency be permitted at any time to issue short time notes of not longer than six months' circulation, and upon the following terms and conditions:—

1st. That such bank shall pay in advance to the treasury of the United States one-fourth of the lawful or regular bank rate of interest for the entire time of such issue's limit, and said limit of issue's time shall always be designated at the time of application.

2nd. That all such bank issues shall be made for a specific purpose, such as the harvesting of crops of grain, picking and preparing for market crops of fruit, or other absolutely necessary transactions requiring an abnormal local circulation for a short season of the year, and which purpose shall always be specified with application for an issue.

3rd. That every bank making application for an issue of currency shall agree and sign an agreement to never loan more than 50 per cent of the market value of securities taken and to insure to keep insured to double of the amount loaned all of such securities taken, and to keep subject to the order of the comptroller of currency a distinct and separate account of all loans for which bank currency is used, and to keep all notes and securities taken for such loans separate and distinct from all ordinary transactions and obligations of the bank, and to hold all of such notes and their securities, together with the insurance, or the funds received in their payment as a redemption fund and a guarantee that each and every note of the bank currency shall be promptly redeemed, and the comptroller of currency is hereby authorized to hold each and all of such obligations and proceeds of bank currency loans until such currency is redeemed, or until United States coin or currency is deposited with the secretary of treasury for their redemption, and the government hereby guarantees their certain and prompt redemption, or exchange for United States currency.

4th. That a violation of any obligation to the government herein required of banks of issue by any officer, or employe of such bank, shall render each and all of such offenders guilty of felony and punishable by imprisonment for a term of not less than fifty years at hard labor, and confiscation of each and all of such offender's property towards, or to the amount of such defalcation.

5th. The national bank currency of the United States of America, which may be issued under the provisions of this act, shall read:—

"The National Bank of —, county of —, state of —. \$—. Limit of circulation, —. Legal tender for all dues and demands, public and private, receivable for all dues of government, and exchangeable at the treasury of the United States for regular coin or currency of the United States of America, at the option of the holder."

6th. National bank emergency currency, as provided for in this act, shall be issued by secretary of treasury at the expense of the applicant, and in denominations of from one to twenty dollars, but shall be of a distinct and separate design and coloring.

## ARTICLE TENTH.

## GOVERNMENT EMERGENCY CURRENCY.

Section 1st. That our president is hereby authorized to order an issue of emergency currency of the United States of America whenever the exigencies shall have convinced himself, the comptroller of currency and a majority of the cabinet, that an issue of emergency currency may be necessary to save borrowing in providing for the public defense or in the promotion of the public welfare, but such issue shall always be limited to the actual necessities of the government in the emergency, and pending the convening and action of congress providing for a special revenue and collection of the permanent or regular currency for the retirement of the emergency currency, but no emergency currency shall ever be issued except for some necessity in the interest of all the people of our United States, such as the purchase of the right of way and construction of an isthmian canal, or like investment, involving the general welfare of all the people, or wherein the protection of the public defense is at stake. The intent and purpose of this act being to enable the legitimate exercise of government credit in the interest of the general welfare without having to borrow.

Section 2nd. That no issue of national emergency currency shall ever be made for a longer time than five years from the date of such order, unless a specific act of congress authorizes an extension of said time and such issue shall be retired at maturity, and at the option of the secretary of treasury at any time before maturity whenever and as fast as current receipts or a special revenue, or both, shall have collected of the regular currency an amount in excess of the government's current requirements.

Section 3rd. Emergency currency of the United States of America shall read:—

United States of America emergency currency. Limit of circulation, — years, a legal tender for all dues and demands, public and private, and receivable for all dues of government, exchangeable at the treasury for regular coin or currency of the United States of America, at the option of the holder.

Section 4th. In the event of an issue of an emergency currency it shall be the duty of the president to have the secretary of treasury to furnish congress with an estimate of the amount of revenue necessary to retire all of the emergency issue within the limit of its authorized circulation, and whenever a special revenue provided for the retirement of an emergency currency shall have collected of the regular currency an amount equal to the emergency currency to be retired, then it shall be the duty of our president to suspend a further collection of such special revenue.

Section 5th. The national emergency currency provided for in this act shall be of a specific coloring of its own, but may be in any denominations to suit the purposes of the government.

Section 6th. In the event of an emergency currency issue the president may have silver or minor coins issued to any amount necessary to accommodate the needs of government, and all such coins shall be a legal tender as hereinbefore provided for such coins.

## ARTICLE ELEVENTH.

## UNIVERSAL COIN AND CURRENCY.

Section 1st. Resolved that our president is hereby authorized and requested to appoint a commission of three or more, as in his discre-



tion may seem advisable, to negotiate with every nation for the adoption of a universal standard of money and the provision of a coin and currency of identical parity for the world, and the sum of \$100,000 is hereby appropriated to defray the expenses of such commission, and the secretary of treasury is hereby authorized to pay the same out of and credit of the government not otherwise appropriated, and charge the same to the account of international currency.

## ARTICLE TWELFTH.

Section 1st. That all acts and parts of acts existing contrary to, or conflicting herewith, are hereby annulled and repealed.

## EXPLANATION.

In explanation of the principles of fact involved, and upon which the foregoing measure is written, and in its comparison with our present monetary act, or with that which the Hon. C. N. Fowler, chairman of the house committee of banking and currency, or any one else has ever introduced or recommended, I submit:—

1st. That my measure is written not only in recognition of the necessity of a definite standard of money for the sake of knowing positively what valuable, and what quantity of that valuable, all kinds of our coin and currency shall represent; but this:

2nd. It is written in recognition of the fact that the highest or most valuable standard of money possible is absolutely necessary to even permit of providing for the present possible volume of money, and because the principles of business is that all subsidiaries or inferiors are and of right ought to be subject to their superiors, and consequently may forever properly act subject to their superiors; but that no superior can ever properly act subject to an inferior, so if we would properly employ two or more factors in our volume of money, we must honor the most valuable one with being money, and then employ the less valuable ones with being assistants; for if we honor the least capable with the authority of dictating to the most capable, we cannot enjoy the ability of the more capable, so that as I see it, the gold standard of money instead of being a financial cross of unnecessary contraction upon which to crucify the people, it is a financial couch of the greatest capacity and comfort yet discovered, and instead of being a crown of financial thorns with which to distress the brow of the poor, it is a financial bower of sweetest roses, permitting the rift and intelligence to decorate home not only with the acquirements and accomplishments of the locality or of a state, or even a nation, but of the world, and with the greatest degree of convenience possible in anything known, and enjoying an existence above condition.

3rd. My measure is written in recognition of the fact that the highest or most valuable standard of money possible is absolutely necessary to even provide for a money of the greatest possible convenience, for the greater the value the greater the convenience in a money of great quantity, three principles and conditions in money fundamental and absolutely indispensable in providing for a satisfaction of business intelligence in a monetary measure and system for any people, for it is impossible that intelligence could ever be satisfied with anything as a measure for either quantity, dimension or weight, without having the measure defined so as to know positively what it was to represent, and to also know that everyone alike must comply with the same measure, and so with money, for no one would loan dollars of the value of 23 and 22-100 grains of pure gold and be satisfied with a law which would permit his debtor to pay him back in another kind of dollar not worth over ten grains of gold, and which the 16 to 1 would have compelled every creditor to accept.

Neither can intelligent people be satisfied with an amount or volume of anything as good and useful as money and know that they might just as well have more and the advantage of a greater volume of it to enjoy, and especially so if they know that the only cost of having more would be to simply write the permission and conditions.

Neither can intelligence be satisfied with the use of anything for the sole purpose of a business convenience and also know that the only cost of providing for the thing in a form of greater convenience would be to write the conditions and dimensions.

But not only is my measure written in recognition of the fundamental principles of money itself, but it is also written in recognition of five principles of fact involved in the use of one or more factors as an assistant money.

The first is that anything entitled to use as a money at all is of right entitled to free and unlimited use; for intelligence not only needs their assistance, but must have their greatest possible assistance if we would enjoy what the Author of Nature has provided for our comfort, convenience and intelligence.

2nd. It recognizes the fact that to provide for the free and unlimited use of any subsidiary and have its own coin and currency always a representative of the identical value of the primary, and have it so without involving a liability or even the possibility of loss to the government, it must be made responsible for its own transactions and responsible for the redemption of its own currency, that is to say, each subsidiary must be made receivable at its primary value and its coin and currency must be made redeemable in the primary value of its own self, and the same principles applied which will provide for the free and unlimited use of one subsidiary without liability or even possibility of loss to the government will, of course, provide for the free and unlimited use of any number of subsidiaries without liability or even a possibility of loss to the government, and consequently, then, if this can be done, any nation, however weak or poor, can adopt the highest possible standard of money and enjoy the advantages of the free and unlimited use of everything entitled to use as money at all, and can do so just as easily and just as safely as the greatest nation of the world could.

3rd. It recognizes the fact that each factor entitled to use as an assistant money at all is of right entitled to a distinct and separate share and interest in transacting the nation's business, for they are each individuals to be honored as an agent of intelligence with the performance of a specific job in the service of mankind, and consequently the value and usefulness of each will depend upon its being permitted of doing just all it possibly can with acceptable convenience to its employer, for they are each possessed by divine authority with qualifications, recommendations and interests each of their own, so to permit any one of them to be defrauded and deprived of any part of what it could acceptably do for use would be not only to lose its service and consequently unnecessarily deprive ourselves of what it could do for us, but also to wrong and depreciate the value of the one defrauded.

4th. It is written in recognition of the fact that to obtain and enjoy the greatest possible service and profit of a number of monetary credits, the least capable or least valuable one must first be accorded and protected in just all it can possibly do within a respectful regard to the convenience of the employer, and then the next more valuable one must have just all it can do within a respectful regard to the convenience of its employer and so on up to the primary. This will accord to and protect each in a share and proportion of business which will forever insure each one an opportunity for doing their greatest and most valuable service to man and will consequently insure to their producers the greatest possible demand and price for



and profits on their product, so if we honor silver with the entire responsibility of our domestic circulation we should afford to it the greatest possible opportunity in the service of mankind, and consequently restore it to the greatest possible value, for money metals, like mules, to be valuable must have profitable employment.

5th. It is written in recognition of the fact that, though all subsidiaries are of right entitled to free and unlimited use and coinage, no subsidiary is of right entitled to a legal tender authority above the first demonstration of its first predecessor, that is to say, if silver be of less value than platinum, then silver's greatest coin should not be allowed a legal tender authority above the first denomination of platinum, and if platinum be of less value than gold, then platinum's greatest coin should never be allowed a legal tender authority above the first denomination of gold, so then, if we should ever find anything, or any number of things, of greater value than gold, and entitled to use as a money, we should honor the most valuable one with being our money and limit the legal tender authority of gold to the first denomination of its first predecessor. It seems this ought to be plain to every one, for the principles involved are the same as the principles involved in the office of president, 1st vice president, 2nd vice president, and so on to any number, so to permit any assistant the authority of disputing the dictation of even its first predecessor would be to destroy the office of the predecessor.

But in addition to the fundamental principles of money itself and in addition to the fundamental principles of subsidiary money, my measure is written in recognition of the following principles and conditions involved in the reception, disbursement, and economic, and efficient use of all money metals:

1st. It recognizes the fact that the relative value of all things may fluctuate because of the fluctuation in the relative supply of either of them and that too, even though the demand be practically fixed and unchanged toward either or any one of them.

2nd. It recognizes the fact that the relative value or usefulness of any number of things may fluctuate because of fluctuations in the demand for either or any one of them, and that too, even though the relative supply has remained unchanged.

3rd. It recognizes the fact that the relative value of all things may depend upon where they are, that is to say, that gold and silver may not be of the same relative value at Butte, Mont., that they are upon the same day at New York, because it might cost proportionately more to get one delivered from the mines than it would for the other—for instance, it now costs the government \$7.75 expressage on a thousand dollars of silver from the mint at San Francisco, Cal., to the bank at Pomeroy, Wash., while it only costs the bank \$1.50 per thousand dollars expressage on gold, a difference of \$6.25 per thousand and a difference of \$6,250 on a million dollars.

4th. It recognizes the fact that the amount offered may effect the relative value of any number of things, for no one will ever give as much relatively for more than they need of anything as they would for just what they need.

5th. It recognizes the fact that though a currency, if issued by a responsible holder of the money it represents, may be just as valuable in any domestic transaction as the money itself, nothing but actual money or its assistant can possibly serve a nation as a monetary credit, because the nation is the source of authority and declares what shall be money and what shall be honored as assistant money, and also must, to have their currency as good as money, declare that every holder of the nation's currency shall have either money or the value of money in it as assistant money at any time in exchange for their

currency, if they wish, so while no person, corporation or association, could afford to undertake to be responsible for the care and keeping of so vast a quantity of property without being paid for so doing, the nation can well afford to take the responsibility of the care and keeping of all the people's money and without charge, because it is kept for the benefit of all the people, and the best interest of the people demands that their money be placed to their public credit and kept in the care of their government.

6th. It recognizes the fact that if the people of any nation shall honor their money with protection from domestic circulation and place all they have to their public credit, and subject only to the demands of their government, that then their government will constantly and perpetually have all the money that they all have, and consequently then their government will not have to run out and borrow of Tom, Dick and Harry at every emergency in excess of current receipts and subject the whole nation to taxation for the payment of interest to individuals, corporations or associations, as we and every nation of the world have ever done.

7th. It recognizes the fact that in the case of our own government, if we had at the time of our present measure's enactment, or if we should now provide for a condition which would induce every one of us to place our money to the credit of the government, and which can be done without cost or inconvenience to any one, that then our government would have more than a billion dollars in gold, and half as many dollars' worth of other metals—money enough to pay our interest-bearing bonds of \$868,000,000, and hundreds of millions of dollars left, instead of refunding them for thirty years, as we did, and would have saved to our public credit the hundreds of millions in interest our present measure now compels us to pay.

8th. My bill is written in recognition of the fact that a condition provided in a monetary measure which would induce every one having gold, or gold coin, to place it to the credit of their government and take a currency, because the currency would better accommodate their business convenience, would also induce the holder of government bonds, if he wished to do business rather than draw interest, to deposit his bonds to the credit of his nation and take a currency instead of gold coin, though his bond called for gold coin, simply because the currency would better accommodate his convenience also, so that the government could have liquidated our interest debt at maturity, or at any time before upon presentation and have had almost every dollar of our gold still left to our public credit, for under the operation of my bill no one will ever again want gold as a money, unless they are going to leave the country.

9th. My bill is written in recognition of the fact that though the government only of any people could afford to assume the responsibility of keeping and perpetually care for their money, without being paid for doing it, the government of any people can well afford to, because to do so would forever place the government above having again to borrow, at least until they had exhausted their entire monetary credit.

10th. It recognizes the fact that if any people will honor their money with protection from all unnecessary use as a currency, such protection would result in saving to the perpetual credit of the world all that is now worn out and wasted by its unnecessary use as a currency.

11th. It recognizes the fact that all classes of every people are of right entitled to an absolutely safe place for the deposits of their monetary credits and that every government ought to of right pro-



vide for a national banking system which would insure every depositor the certain and prompt payment of his deposit, even though the bank should fail.

12th. It recognizes the fact that every national bank is of right entitled to government protection from a depositor's panic.

13th. It is written in recognition of the fact that to make the national bank the only safe place of deposit will insure the banker the constant and perpetual use of his customers' deposits, and bring from their hiding place the millions that are now kept secreted in private vaults.

14th. It recognizes the fact that to insure the depositors of a bank against the possibility of loss and then to insure the banker against the possibility of a depositor's panic will provide for the greatest possible stability to business and provide for the greatest possible protection against financial panics.

15th. It recognizes the fact that to compel the miner to toil until he gets 23 and 22-100 grains of pure gold, or the value of it in some other valuable before he can get credit for a dollar, and then to make the banker a present of a credit for a dollar to go out in competition with the miner's hard earned dollar, and simply because the banker was fortunate enough to own and control a dollar which the miner had produced, is both unfair and unjust to the miner.

But this is not all, for after we have provided for the very best money the Author of Being has created for us, and have provided for the greatest possible volume of it, and then provide for the most economic and for the most efficient use of all we may ever get, and then provide for an absolutely safe place of deposit, and then insure the banker against the possibility of a depositor's panic, and by it provide for the greatest possible business stability and security against financial panics and their awful consequences, we are still entitled to two emergency currency acts to enable legitimate exercise of government credit without having to pay interest to individuals, corporations or associations.

The first we need in the interest of local affairs with which to meet the abnormal demands of harvest, or other kindred local requirements, which often demand millions of dollars in a locality for only two or three months of the whole year, and which if supplied by the government for a share of the profits, would not only insure us a currency equal to the demands of any harvest expense, but it would do so without distressing or interfering with the financiers of our money centers, and without interfering with the permanent and constant employment of our regular currency, and besides would enable us to keep at home the millions of dollars we must now pay to the people of other nations for the use of their money with which to harvest, and for my part, I would much rather pay to the public credit of my own people whatever interest I must pay for the use of an emergency currency than to pay interest to any other people of the world.

The second we need in the interest of government with which to meet the emergencies of war or other demands upon the government in excess of regular receipts.

That an act of this kind would have enabled our government to have met the expense of the Spanish-American war and without borrowing a dollar of any individual, corporation or association, is too apparent to even warrant a mention, and that it would have saved the interference with the local business interests and intentions we imposed upon our people of almost every county of our entire nation by asking them to subscribe to a loan for government, and which very greatly interfered with the normal development of local enterprises both on the farm and in the factory, and besides which such an act would have saved to the public credit the interest we must

now pay to the individuals, corporations and associations who loaned our government their money, so as a people we have not only had to suffer the self-denial imposed by a postponement of the local business interests, comforts and conveniences to the two hundred million dollars we subscribed for our public defense would have enabled us to have accomplished and provided, but now after suffering the self-denial of our interests and wishes for years we are subject to a tax for the interest to be paid those who loaned the government their funds, yet the tax we contribute for the interest on our Spanish-American war debt is insignificant compared with the consequences and costs to business of withdrawing hundreds of millions of dollars of our permanent currency out of the ordinary channels of business enterprises; and if there can be any safe way of meeting the demands of any such emergency with an emergency currency and permit the regular currency to remain in the regular employment of domestic industry, we are of right entitled to it, and should be permitted to enjoy its advantages.

To Recapitulate:—My bill will provide for a money and a monetary system of a definite standard and illustrates the principles involved in providing for the greatest possible convenience in money and in providing for the greatest possible volume of it, and in providing for the most economic use of it, and providing for the most efficient use of all we may ever get. It shows how to accord each factor with its respective rights and interests; it shows how to liquidate our interest-bearing bonds with our present monetary credit, and how to keep from ever again having to borrow; it shows how to provide an elastic emergency currency, equal to the demands of any harvest, and how to do so to the advantage of our public credit instead of to the money-lenders of other nations; it shows how to exercise government credit in its own defense, or in promotion of the general welfare, without paying interest until it has at least exhausted its entire monetary reserve, and does so without injury, cost or inconvenience to any one; it provides for a banking system with all the advantages, and with even greater security to the depositor than a parent banking system, and does so without subjecting any place or locality to the competition of any kind of a parent banking trust—not to mention one such as Mr. Fowler proposes, in which one set of directors, if not one man, may dictate the entire currency issue of a nation, and then enter into competition with the banking interest of any other nation who may permit us a franchise and charter, a condition which would permit the banking interests of the whole world to unite in the interest of a monopoly, when and whereas the only security to any people of accommodation at reasonable compensation is that of competition.

My bill provides a banking system which will forever insure every national bank against the possibility of a depositor's panic, for it provides a condition which will induce every one to bring out of hiding and out of private keeping to the bank every dollar that can be spared from their pockets and their tills, and then to let them forever stay subject to the use of the bank, unless absolutely needed, for under my bill the national bank is to be the only safe place on earth to the individual, corporation or association, for monetary credit consequently no one will ever take a dollar from the bank until compelled to use it, and then it will be brought back just as soon as one gets it who does not need it in the pocket or in the till, and consequently there can never be another financial panic caused by the depositor's withdrawal of his deposit through fear of the bank's failure.

My bill will unite the entire banking interests of the nation in a common cause to defend themselves against all kinds of recklessness, mismanagement and rascality, and which ought to result in so uniform, rigid and comprehensive a regulation that, instead of bank's failing every month, we shall not have a bank failure in months, and intelligently managed there need never be another.

My bill enacted will relieve the government from repeated or endless redemption, which in the past has cost us many millions; it



will relieve us from all expense of circulation, which now costs us between a third and a half million dollars a year; it will also relieve us from all unnecessary expense of coinage, which now costs us thousands of dollars annually.

My bill is applicable to the whole world and provides a condition in which every nation from the least to the greatest may unite and adopt the highest possible standard of money, provide a coin and currency of identical parity and enjoy the free and unlimited use of everything entitled to use as a money.

Our present monetary act and system does not provide for a single condition of the twenty-five herein enumerated, but Mr. Fowler's proposed bill would provide for two of them, viz.: a definite standard and relief from endless redemption. His bill would also provide for an issue of permanent currency upon a bank capital, which may be squandered at any time, but he would deny the miner the privilege of exchanging his indestructible money metal for a currency. My bill would say to all alike, that if any one, corporation or association, wants to increase the coin or currency of our United States you must bring to the credit of the government gold or some other valuable entitled to the credit of money before you can have it. And which of the two conditions do you believe will be best? Which would you rather have, a currency of your nation, the representative of a valuable, in the care and keeping of your nation, and which you or any one else might get at any time if needed, and when not needed be a perpetual credit to your government, and always available for the protection and promotion of your public welfare, without waiting to borrow or having to pay interest, and the only limit of our volume of such credit to be the value of the money metals we may mine? Or would you prefer a currency issued upon the credit of a bank, which would be a constant liability and fruitful source of panics and then be denied the privilege of credit for the production of our mines, and besides have our nation a helpless one, dependent upon and subject at every emergency to the dictation of a set of bankers? I would choose the currency of our nation, issued for gold, or the gold value of some other valuable, which fire cannot burn, nor frost blight, nor hot winds parch, nor rascality squander, but which may endure as a monetary credit and source of financial independence to our nation forever; and now let all understand that it is up to the American people to decide at our next congress which of the two policies and conditions we shall have, and let all understand that if we permit a parent banking trust to be fastened upon us that we shall subject ourselves to a trust that will fleece every locality for the benefit of the parent, and to which our nation may be as helpless a dupe as is England to the Bank of England.

To provide a banking system which shall permit the government to insure them against the possibility of a depositor's panic will provide a stability to banking and to business and a security to investment hitherto unknown.

My bill will relieve every national bank from the obligation of holding or maintaining a gold reserve.

My bill would forever place our government above having to borrow, while our present act, or that which Mr. Fowler proposes, would forever subject us to the necessity of borrowing at every emergency exceeding current receipts. Would it not be a pleasure to see our nation out of interest debt and with more than a billion dollars in gold and with half as many gold dollars' worth of other money metals to our public credit, or would you rather see our nation with only one hundred and fifty million dollars to our public credit and subject to an interest-bearing debt of practically one billion dollars, drawing an annual interest of at least twenty million dollars? I would like to see Uncle Sam free from ever having to pay another cent of interest, and out on the highway of possibility with billions of dollars to his credit, and I would like to see our people enjoying the privilege of increasing the volume of their public credit to the value

of all the money metals our energy and enterprise may inspire us to produce, for if permitted the privilege of unlimited use of all money metals we would increase our monetary credit by at least fifty million gold dollars' worth annually above what we will do, or can do, under the present act, or under the bill which Mr. Fowler proposes, so that as I see it, my bill enacted at the time of our present act would have saved to our public credit the interest on our present debt, amounting to about twenty million dollars annually, and which for thirty years would have amounted to more than \$500,000,000, and besides would have saved the expense of circulation, which now amounts to more than a million dollars, and all of which I offered to show Secretary Gage of what and how to do, if he would only agree to recommend that congress allow me something for the suggestion; but he replied that it was impractical to offer any compensation for a suggestion on the improvement of our monetary or currency interests, and which I understood to mean that he thought he certainly knew as well as I possibly could, and I judge that I might, as far as his reason conceived, just as well have said, "Here, secretary, I will show you how to make Niagara run straight up," as to have offered any plan for the liquidation of our bonds instead of refunding them. It was so far ahead of any conception of his, and the offer of providing for the free and unlimited use of silver, under a gold standard, was, I judge, to him, little or no less absurd. But I believe that even a casual glance at my bill will convince any expert that it will provide every claim enumerated, and if so, it solves the monetary interests of the world forever.

There is but one question involved, it seems to me, which any financier would stumble over and fail to comprehend, and that is, if great quantities of silver should be received at, say one dollar an ounce, and then eventually it should ever decline to fifty cents an ounce, would not the government lose the decline? It seems so, but I answer no; for under the conditions provided the government can never lose a cent, and for several reasons, among them which are, first, that we do not give anything for it, we only receipt for it in currency, so that before we could ever lose in the deal the currency must come back and the silver be all withdrawn from the government, so as to compel the government to buy to make up the deficiency, and, secondly, we have provided a condition in which it would be as impossible to return the currency so as to take the silver away from the government as it would to invert the law of gravity and compel the rivers to flow to the summit of the mountains, for the rivers are no less subject to the law of gravity than our currency, under my bill, is subject to the law of necessity. I believe that it will be plain to every student of currency that under my bill to ever take a monetary credit from the government, the one taking it must retire his currency, and consequently forego and give up the business opportunity his currency would afford him, for my bill will make of the government an ocean into which all money metals must be placed before they can be made available as a monetary or currency credit, and consequently when placed to the credit of the government it will be for the sake of a currency, and so before they can ever be taken from the government the people must decide to give up their currency and abandon business absolutely, and to abandon business absolutely would mean death to all at once, for the world cannot live without the transaction of business; and under my bill the only way to get a currency at all with which to do business is to place some money metal to the credit of the government, and then the only way to keep a currency with which to transact business is to let the money metals stay to the credit of the government, and, as has been said, the transaction of business is an absolute necessity of life itself, not to mention any of the comforts or conveniences of civilized life, or means of information, or education, each and all of which are absolutely dependent upon the use and employment of a currency, for without a cur-



rency it is utterly impossible to have a book, a paper, or any other means of education, or in fact anything else beyond the natural provisions of nature, for without a currency it would be impossible to have an implement, or shop of manufacture, or any vehicle of conveyance, or ship of commerce; so it seems to me that the impossibility of ever taking the money metals from our government, under the operation of my bill, will be plain to all students of the question, and if my bill is an improvement on what the world has ever had so far, its enactment does not involve, like most improvements, an outlay or investment of great capital in its provision, for the only expense necessary to its enactment is merely its writing, and then its operations will be cheaper by many thousand dollars annually than what we now have, and best of all it is in the interest of every person and against no one; while to do anything less in a monetary measure in this age of reason than to provide for the very best money the Author of Being has provided for us, and then at least to provide for every condition of its enjoyment, enumerated in my bill, would be to disgrace ourselves, expose our ignorance to the world and unnecessarily defraud and deprive ourselves of what the Author of Being has provided for us.

Very Respectfully submitted,

CHAS. ALBERT LONG.

Pomeroy, Wash.

PRESIDENT RICHARDS: Mr. Drake, of Oregon, desires to make a few remarks at this time.

MR. DRAKE, OF OREGON: Mr. President, Gentlemen of the Convention and Delegates: I appreciate the necessity for those who have anything to say to be brief and to the point. The 100th anniversary of the acquisition of the Oregon territory originally by the United States, which was acquired by Captains Lewis and Clark, appointed by President Jefferson, will soon be here. It was a great event. I have no time now or inclination to discuss it or to deliver a lecture to you. Some eighteen months ago the people of Idaho, Washington, Oregon and Montana in a general way began to discuss the 100th anniversary and some appropriations were made to celebrate that glorious event. At the last session of this congress this question came up and it was one of the first organizations to take cognizance of the propriety of the observance of that anniversary and by resolutions adopted at Butte, declared itself in favor of the observation of that anniversary by the people of the Northwest. Since that time an organization has been perfected in Oregon by an incorporation to which private subscriptions have been made in large sums of money for the purpose of celebrating that event at Portland, its chief city. The state of Oregon has appropriated \$500,000 in furtherance of this object. Every one of the mining states through its legislature has appropriated moneys and funds for the purpose of mineral exhibits and for the exploitation of this industry at St. Louis and Portland. All this has been done since the first recommendation on the part of congress and I desire now, if you will kindly permit me, to read a little review of this action in the form of pamphlets and a further declaration on behalf of this Congress on the propriety of the furtherance of the objects of that organization, and ask you to adopt them.

The resolution was referred to the committee on resolutions.

MR. MUIR, OF OREGON: As one of the delegates from Oregon, I wish to read a telegram from the representative of the State Mining Congress that is now in session at Portland.

"Portland, Ore., Sept. 7th, '03.

Oregon Delegation A. M. Congress, Deadwood, S. D., Franklin Hotel:

State Miners' Association perfected today with large representation from all parts of state sends greeting to American Mining Congress and desires that Portland be its next meeting point. A cordial reception will be given.

A. L. MORRIS, Secretary."

We come here from Oregon to attend this Congress for the benefit of the mining interests of this territory. We do not come here to represent any exposition that may come in 1905 or any other year. It is to the advantage of the state of Oregon or any other state to get this Congress to meet at the very first opportunity and we desire the Congress to be held at Portland in 1904. We desire that the American Mining Congress will receive the entire attention that can be given it when the city is at itself and not when other matters require its attention as it will be in 1905. Nineteen hundred and four is the year we want it. (Cheers.)

MR. BENNETT, OF MINNESOTA: I have a short resolution I would like to offer if it is in order. I would like to state what prompted that resolution by stating the circumstances. There came to our city a few years ago from Washington and I am going to divide the honors of this case between Washington and South Dakota, the statutes under which the organization was made, and Idaho. The gentleman came to Minneapolis and of my knowledge he did not have enough to pay a month's rent for rooms. In a year, and a half he had organized four corporations, wheels within wheels, with nothing under heaven but options on property. The last corporation he organized was for a half billion dollars, then our attorney general aroused himself and the public examiner cleaned him out of town; but in the meantime he had cleaned out the servant girls, stenographers and clerks and some of the old ladies and widows and a few preachers, and took away about \$250,000. They couldn't find he had any money; it was gone. Those things do not tend to create confidence of the general public in mining enterprises. It creates quite the reverse. The miner gets the benefit of it by having to sacrifice at least half of his property before he gets in a position where he can realize anything, so it occurs to me that the Congress ask the various legislatures to protect their own people and at the same time protect the miner by such legislation as they may pass to check this evil, for it is a general evil, not confined by any means to any one place.

PRESIDENT RICHARDS: The resolution will be referred to the committee.

MR. PATTERSON, OF NEBRASKA: Apropos to that resolution I would like to suggest this, that corporations organized for the purpose of selling mining stocks are not the only ones that are over-capitalized and largely inflated. You need only to go down to New York and New Jersey to find organizations capitalized for millions and billions, as the gentleman has suggested, many, many times more than their intrinsic value, so that I would suggest that resolution be for all organizations.

MR. CONZETTE, OF SOUTH DAKOTA: The principle involved in this resolution is all right, there is no question about that, but it strikes me that our organization cannot constitute itself the guardian of the people and if we attempt to constitute ourself the guardian of the people we couldn't do it. The suckers will bite, no matter what sort of protection, legal or otherwise, you might throw around them, and another thing, I don't like to advertise in a resolution of this kind that the mining countries are full of those things. If you will amend the resolution to simply state that this Mining Congress protests against over-capitalization or anything of that kind, I am with it. But to go on in that resolution and specify that the mining countries are overrun with that sort of thing, you are conveying an idea to the people outside that may give them a wrong impression.

A short recess was taken.

PRESIDENT RICHARDS: In order that the committee on nominations may have an opportunity to work over the evening, I have appointed on that committee Mr. Patterson of Nebraska; Mr. Grayson,



of Oregon; Mr. Rinehart, of Colorado, Mr. Jackson, of Idaho, and Mr. George, of South Dakota, to make recommendations to this body.

**MR. PATTERSON, OF NEBRASKA:** I would like to have that committee meet at their convenience at the Franklin Hotel at 8 o'clock this evening.

**PRESIDENT RICHARDS:** We will now listen to an address from Dr. Stephen de Zombory on "Aerial Tramways as an Economic Means of Transportation."

**Ladies and Gentlemen:** In addressing you upon the subject of aerial tramways as an economic means of transportation, it is not my object to enter into a technical discussion of the subject but rather to discuss the conditions which warrant the construction of such aids to mining enterprises and those types which will give the most satisfactory results from the mine operator's point of view, as well as some of the many advantages of this system of transporting ores from the mine to the reducing plant.

The time is too short to enter into an extended discussion of tramways and their development. As a curious fact we could mention that wire ropes served for transportation methods many centuries past and research among the ruins of Pompeii have brought to light wire rope, specimens of which are to be seen in museums in Naples at this day. Or I could mention, too, that there are wood cuts in some of the medieval German books which show perfectly developed tramways. The early sciences of this method of transportation passed into oblivion, however, and it was not brought again into extended use until the 40s of the last century.

Almost from the origin of trams we find that two distinct types were known—the single and the double rope trams. The home of the former was in England, while the double rope system is extensively used in Germany and the whole world. So widely spread is the use of rope tramways that it is also interesting to note that in Germany there is a single manufacturing concern which during the quarter of a century it has been in existence has turned out over 1,800 tramways.

The experience of the past two or three decades have shown marked advantages of this type of transportation. Discussing the merits of both the single and double rope types the advantages might be expressed thus:

Undulated profile is of little importance, since these tramways are equally effective on plains or in a very mountainous country. Expensive understructures, viaducts or trestle work is absolutely unnecessary, the ropes being suspended on wooden towers which are of simple construction, erected at intervals of two or three hundred feet. If the formation of the ground does not permit these distances, it is possible to construct spans of even as many thousand feet. Deep gulches and ravines, which are effectual barriers to transportation means of other types, offer no obstruction to a rope tramway and some of the finest tramways in the country have solved just such problems for mine operators. Climatic conditions in no manner interfere with the action of a tramway, permitting the continuous operation in most inclement weather. Thus the heavy expense of keeping mountain roads open during the winter are avoided. Being economical both of construction and maintenance, it proves to be the real friend of mine operators who are operating on even a moderate capital.

Another marked advantage is the fact that the time occupied in construction is much less than for the construction of other systems of transportation. specially is this true in mountainous country. The adaptability of the tramway is so great that it will meet the most urgent demands made upon it and, unlike rail or wagon roads, should occasion demand, the plant can be wrecked and installed in a new location at moderate cost and with a surprisingly short loss in operating time.

In the main these advantages apply to both the single and double rope types. I do not feel myself entitled to condemn either type. Both have their advantages. I only will compare. The single rope type being much simpler in its construction, having less parts, has the advantage in being cheap in primary cost and erection. Its principal drawback is that it can convey only a limited amount of material. There are tramways of this system with an hourly capacity of 35 tons, yet these particular tramways did not get beyond the experimental stage and it is not advisable to deliver more than 20 tons an hour. The practical mine operator whose hope and ambition is to vastly increase the output of his mine would hardly consent to install a system which in itself was so limited in capacity. Yet its main advantage, as stated, is its cheapness of construction, a fact which always must be taken into consideration.

Another disadvantage of this system is the fact that the strain upon the parts is heavy, with consequent expense of repairs and loss of time in operation, itself no small item in working costs.

The double rope system, which is of far more extensive use, is more costly in installation but is always advantageous on account of its capability of increased capacity as occasion demands in the future development and output of a mine. Speaking of capacity, I could mention that there are lines which deliver 250 tons of ore per hour, which is really a tremendous output. This special line has been in almost continuous operation since the fall of 1898 and since its installation, its repairs have been of such trifling cost that even its builders have been surprised. (Vivero span), English syndicate. Operating costs are low. One Colorado tramway, which traverses a very rough, mountainous country, approximately 10,000 feet in length, is handling ore at a cost of 17.6 cents per ton, with the cost of maintenance 1.5 cents per ton. These admirably low figures are due to the fact that the systems now being perfected require the services of very few men on the entire line. The addition of automatic devices which perform the work of loading and dumping have gradually decreased the labor costs until now only one or two men are required to watch the loading of the buckets. As is generally understood, most of the double rope tramways which are in operation through the mining districts of the country require no power, being operated by gravity entirely. Even then the power which is produced by the weight of the buckets can be turned in a source of profit, being sufficient to meet demands for ventilating purposes, for the operation of dynamos for lighting plants and operating mine pumps, as can be seen in some of the larger Western mines.

The division of the strain upon the ropes of this double rope system reduces the repair bills and at the same time renders the stoppages less frequent.

Returning for a moment to the matter of automatic systems: There is today a tendency to render these tramways more and more automatic in their operation. It is a question in the mind of the trained engineer just what is the limit. What is of more concern to the prospective or actual owner of a tramway? How far can we go in making the tram entirely independent of human control but then take the risk of the eventualities which are connected with all such machinery?

Reduction of labor costs is always an object in considering operating costs, but yet, in the opinion of many engineers, it will not be advisable to entirely dispense with it. The aim of the constructing engineer should be to plan a tramway which would be as nearly automatic as consistent, with due regard for the safe conveyance of its traffic.

In all the double rope systems which are in general use, the principle of construction is the same. That is, the ropes, pulleys and sheaves, as well as the other machinery in use, perform their duties in the same general fashion, differing only in design. The



difference between the systems is chiefly in the manner of attaching buckets to the rope. Therefore, double rope tramways might be divided into three general types:

First, that system in which a clip or lug-nut is permanently attached to the running rope which drags the bucket suspended on a standing or immovable rope.

Second, that system in which a clutch fastened to a bucket seizes the running rope and remains attached thereto by means of friction. This latter system might be further subdivided into two classes: One in which the friction is created by an eccentrically operating lever locked and released automatically, securing a constant friction, that is, independent of the angle which the traction rope forms with the horizontal; second, one in which the clutch exerts friction on the traction rope by a lever on which the weight of the bucket is transmitted. This friction varies with the cosinus of the angle the line forms with the horizontal.

The third and latest development is that system in which the buckets are fastened permanently at certain distances to the traction rope. On this system the buckets are loaded with a walking bin which runs simultaneously on parallel rails above the buckets in the station, loading the same.

It is here impossible to enter again into extended discussion of the merits of these three systems of double rope tramways. As my time is drawing to a close, I will only mention some of the most marked differences. The clip system enables us to handle the buckets at exactly the same intervals. This prevents accidents which might result from the failure of laborers to keep the buckets loaded and moving at the proper distances. One marked disadvantage of this type is the fact that the wear on the traction rope is constantly in the same place, thereby weakening the strength of the rope at these points. Shifting the clips from time to time is resorted to in an effort to overcome this difficulty but with a more or less extended loss of time. In the second class this difficulty is not encountered because the grip seldom ever clutches the same spot on the traction ropes twice in succession. Slight alterations, also, in the relative positions of the buckets on the rope work no disadvantage in the operation of the second type. To secure an even distribution of the buckets along the line, signals are easily arranged by which the workman is enabled to estimate the proper intervals. With the assistance of the eccentrically working frictional grip arrangement, as well as with the clip, all grades can be overcome, because the friction on the rope is constant and uniform. In the type in which the weight of the bucket is transferred by means of a lever on the clutch and is transformed to friction, the limitation of grades which can be overcome is confined to those not in excess of 4 degrees.

The third system, that in which the buckets are attached permanently to the traction rope, is probably the most promising one, as here the loading as well as the unloading of the buckets is automatic, with corresponding saving in operating expenses. The more or less complicated clip catchers and grips are done away with. It requires buckets of less expensive construction and overcomes any grade that any other system of rope tramways can traverse. This last type of construction is of such recent development that comparatively few plants are in operation in this country. As far as is known it renders most successful service.

And now a word as to the costs of installation of rope tramways. Naturally, the single rope tramway is the cheaper type of construction but popular opinion is more favorable towards the double rope tramway, as evidenced by the number of that type which have been and are being installed by mine managers. The heavier the traffic to be handled, the heavier and more substantial parts must be used in the construction work. Many other considerations, based upon the peculiar conditions which attend the installation of tramways at different mines, must be considered in the individual case. Generally

speaking, we are within limits when we say that including all the machinery parts the average price per foot of a line constructed may be regarded as ranging from \$1.80 to \$2.00 per foot. These figures include the necessary wire cables, towers, sheaves and buckets. To these figures must be added the construction cost, which vary according to freight rates, prices of timber, labor and delivery to the point of construction. Very naturally this affords a wide variation in costs but as an example it might be cited that in Colorado the construction costs would probably be from \$1 to \$1.15 per foot. Therefore, it is safe to estimate the entire cost of a tramway per foot in this region, where the conditions are approximately the same as in Colorado, at from \$3 to \$3.10 per running foot.

The rope tramways and their application to mining and manufacturing industries the world over is a subject upon which any engineer might talk for hours. The economics which are effected in all industries in which their use is possible are so generally recognized that no argument in their behalf is necessary. Every mining man of the West can probably cite examples of mines whose profitable operation without the aid of tramways would not be possible. The time which has been allotted me is now drawing to a close and therefore, in conclusion, let me repeat a poetic tribute to the tramway, the work of a fellow engineer unknown to me, whose beautiful allegory is more expressive than language of my own:

"Nestled silently in the clouds, away up above the timber line, nature has hidden almost unaccessibly its treasures. Deep down in a valley stands a reduction plant which day by day with the aid of human genius converts ore into wealth. Reluctant to give up her treasures, nature wages a constant warfare with man, calling to her aid the snows and ice of winter, altitude, precipice and ravine. But man won the fight. Two slender wire cables, puny in appearance despite their strength, span ravine, rise over precipice and scale the heights, disappearing among the clouds. With their aid man has encompassed the defeat of nature. Silently, unpretentiously, disdainfully ignoring the grumbling of nature over her defeat and her efforts to overthrow the work of man, the buckets modestly move forward; they are the connecting links between mountain and valley; real private soldiers of the mining industry, always alert, always performing their duty, always obeying their commands and rendering invaluable service in adding to the wealth of the nation."

Ladies and gentleman, I thank you for your courteous attention.

PRESIDENT RICHARDS: We will now listen to a fifteen minutes address by A. H. Elftman, Ph. D., of Colorado, on "The Gold Ores of San Juan County."

### THE GOLDEN SAN JUAN.

By A. H. Elftman, Ph. D.

Upon the arrival of our delegation from Colorado we were informed that we had landed in the richest one hundred square miles on earth. This area we are told is one hundred miles square and in addition the Black Hills include a large slice of the state of Wyoming.

Coming from Colorado, where all that glitters is not gold, we were somewhat skeptical in believing such statements, and decided to make good use of the generous offer of the mine managers of this section and inspect the mineral resources so far as the time would allow.

After examining a large number of prospects in the southern Black Hills in Custer and Pennington counties and seeing the deposits of the northern Hills on the surface and in the deep workings of the Clover Leaf, Galena District, Golden Crest, Columbus, Hidden Fortune, Homestake, Bald Mountain, Spearfish and others and then looking at the large probable mineral areas, scarcely prospected,



we cannot be other than strongly impressed with the fact that the Black Hills people do not seem to realize the enormous possibilities of the future for their section. Year by year additional gold factories will be erected and the Black Hills section is bound to become one of the most important manufacturing centers of the world. Its product will never be a drug on the market and its value will continue at \$20.67 an ounce for several generations at least.

In Colorado, gold is mined and not manufactured. The state is so far developed that the arithmetic taught in our schools neglects imagination and multiplication but emphasizes dividends and extraction. When we hear of one hundred square miles, instead of squaring it we prefer to extract the square root and then compare the size with a district which in an area of fifteen square miles in less than one half the time has produced more gold than the Black Hills and which is now annually producing nearly double the annual output of the Black Hills. I do not know whether this area is on earth but it is sometimes called Cripple Creek.

Let us take our genial host, the Black Hills mining man, to the top of Pike's Peak. Looking to the north and west we see three other massive peaks rising over 14,000 feet above the sea, Mt. Princeton, Mount of the Holy Cross, and Long's Peak. These form the "bearing trees" for the corner stakes of Colorado's mining claim, "one hundred miles square No. 1." On this claim several discovery cuts have been dug: among them we see Cripple Creek, Clear Creek, Gilpin, Boulder, Leadville, Aspen and others, which during 1902 produced \$22,000,000 in gold and \$13,000,000 in silver, lead, copper, zinc and other mineral products. During the last thirty years this claim has produced about \$600,000,000 in mineral values or six times as much as the Black Hills. What Colorado's claim No. 1 will do when developed is beyond the imagination even of the mining promoter.

Turning to the south and west as the rays of the morning sun climb the Sangre de Cristos and dance from the silver lined clouds to summits of Uncompahgre, Sneffles, Wilson and the Needles, we have before us in regal splendor Colorado's claim "one hundred miles square No. 2," the Golden San Juan, home of the tunnel, the aerial tramway and the concentrator.

Taking red mountain as a center, a circle with a ten mile radius will include most of the producing mines of Ouray, San Miguel and San Juan counties. Prominent among the mines are the Camp Bird, Virginus, Revenue, Smuggler-Union, Tomboy, Barstow, Yankee Girl, Guston, Silver Ledge, Hennrietta, Gold King, Sunny Side, Esmeraldo, Silver Lake, Highland Mary, North Star and others. Between these are numerous prospects, the development of which was begun during the last three years and many of which are now nearing completion of the dead work and will soon enter the list of producers. This prospect work has been especially active in San Juan county.

The San Juan district, embracing the southwest portion of the state, produced in 1902. 22 per cent of the output of Colorado. This area produced \$5,490,000 in gold and about the same value in other metals. During thirty years this area has produced \$200,000,000.

One half of all the copper produced in Colorado came from this district. Its gold value was three times the value of its silver. It paid 26 per cent of its production as dividends.

The ores of the San Juan country occur principally in fissure veins which traverse the country in well defined systems traceable often for distances of five miles or more. The veins are well mineralized and at frequent intervals form large ore shoots. The veins vary in width from one foot to two hundred feet. Ore bodies twenty-five to fifty feet wide are of common occurrence. The ore shoots are frequently 1,000 to 1,500 feet long.

Generally speaking the ores of the San Juan country are milling ores. The ores which are or have been worked vary in value from a probable minimum of \$6 to several thousand dollars per ton. A few illustrations will not prove out of place. The ore from the Camp Bird

is all milled and runs from \$40 to \$200 per ton. The Tom Boy ore runs from \$7 to \$20 per ton. The Gold King ore averaged over \$25.00 per ton in 1902 and this will be materially increased during the present year. The Sunny Side ore last year averaged \$35 per ton. Silver Lake ore varies from \$8 to \$70 per ton.

The cost of mining and milling the ore varies from \$4 to \$7 per ton. The mining is principally carried on by tapping the ore bodies at depths of 1,000 feet or more by tunnels. The ore is then transported to the concentrators by aerial tramways.

In milling, the ore is crushed by drop stamps or rolls, then passed over copper plates to the concentrators. About one-third of the values are saved by amalgamation, the balances being saved as concentrates which are shipped to the smelters. The tailings run from \$2 to \$5 per ton. The cyanide process is being applied to these tailings with satisfactory results.

I have only attempted to call your attention to the existence of the San Juan country. In many ways the size of the ore bodies and the original mineralization are the same as those found in the Black Hills. While the San Juan country has always been looked upon as a silver camp it is, however, a unique fact that the deeper the mines go, the proportion of the gold value increasing and free gold becomes more abundant.

**PRESIDENT RICHARDS:** We will now listen to an address by Mr. C. O. Bartlett, of Cleveland, Ohio, on the subject "Mechanical Drying of Minerals."

While the mountains of our country are rich in deposits of gold, silver and other precious minerals, while zinc and lead are found in many of our rich prairie sections, as well as in the mountains, and coal and oil in nearly every section, all of which have been and are now being searched for in every nook and crook, by an army of the ablest men on the face of God's green earth, yet these very places in many instances, rich in deposits of the finest kinds of clays, suitable for the very best quality of fire brick and sewer pipe, crockery ware, paints, and Portland cement. Beds of the finest quality of fuller's earth, marl chalk, travertin, graphite, and mica; and miles of peat in nearly every state from Maine to California, waiting to be made into the very finest kind of fuel for almost any purpose, yet very little attention has been given these so called common stuffs by these energetic and capable engineers.

All of these minerals are rapidly coming into general use, and will very soon command the best brains of our country, in fact the time is right here now.

Ten years ago the manufacture of Portland cement in this country was almost unknown, and we were paying exorbitant prices for English and German brands. Then our engineers began to investigate, to dig and bore, and almost immediately found the finest quality of clays, marls, limestones and chalk, just suited for making Portland cement. In Ohio, in Indiana, and in the swamps of Michigan, in the Lehigh Valley, Pa., in New York, on the Hudson River, within tide water, in Illinois, and Missouri, within a few miles of Chicago and St. Louis, in Arkansas, Colorado, Montana, California, and in many other places, were found plenty of the finest kind of material for making Portland cement. Capitalists were ready to put dollars into the business, and the result has been that last year more than fifteen millions of barrels of the finest quality of Portland cement were manufactured in our country, and of a better quality than could be produced in England or Germany, in fact this might almost be called the Cement Age. Whole buildings are being made of it, at three-fourths the cost of brick, and many railroads are using it in their culverts and bridge work, and foundations are using \$1.50 common labor, instead of \$4 and \$5 expert labor.

To work these clays, limestones, etc. into cement it was found necessary to dry them; it would not do to guess at the amount of



moisture in limestone or in clay, the mixture must be exact, no guessing could be allowed. One per cent too much or too little of this or that product would spoil the cement. Clay varies in moisture from 10 to 25 per cent, limestone from 6 to 12 per cent, hence the actual necessity for some kind of mechanical dryers. As it is with clays for Portland cement, so it is with clays for paints. I know of a certain so called clay near Bedford, W. Va., so rich in iron and aluminum that by simply drying and calcining, in other words, burning out the vegetable matter, leaving iron, aluminum and silica, and afterwards mixing in oil, it makes the finest kind of paint, and so rich aluminum is this particular product that a pine board painted with one coat will stand an excessive heat for some time without burning the wood, in fact it seems to be better than the purest kind of graphite.

I have seen so called clay paint, in Madison county, Montana, so rich in aluminum and iron that by simply drying, pulverizing and mixing with oil, that it has stood a severe weather test for years, in fact it seemed to be as good as the metallic paint, made from the best Lake Superior iron ore.

There are three ways to mechanically dry minerals:

1st. By direct heat; by this is generally meant the use of the Rotary Dryer, or a horizontal cylinder, set in brick-work, with front and grates, similar to a horizontal boiler. The cylinder is set on an incline, and revolves very slowly, from five to eight revolutions a minute. The material to be dried is fed into the cylinder at the front end and at each revolution of the cylinder is carried forward toward the discharge end of the dryer, being continually picked up by the inter elevators, and cascaded while passing through the cylinder.

2nd. By heated air, which has first been heated, either by direct heat or by steam pipes, and afterwards passed through the material to be dried.

3rd. By steam heat direct; by bringing the material to be dried in direct contact with the steam cylinder pipes.

The first method is by far the cheapest, for the reason that by using direct heat a temperature of 2500 to 3000 degrees can be had, while by using heated air the temperature is very much less, and by using direct steam heat, the temperature is only from 230 to 330 degrees, according to the amount of steam pressure, and this temperature is on the inside of the pipes or cylinder, which means considerable less temperature on the outside, where the material is. By first superheating the steam the temperature can be made much higher, but the cost of superheating the steam will nearly or quite counterbalance all gain in temperature.

Great care should be taken in the construction and erection of all direct heat dryers, otherwise no end of trouble will be had; all iron parts should be so constructed as to allow for contraction and expansion, otherwise they will soon break. All settings and bearings for the dryer should be extremely substantial, on account of the liability to get out of place by the settling of the brick-work and by the extreme heat.

The steel sheets of the cylinder should be of the entire length, and all seams should run to the longitudinal way of the cylinder. There should be no cross seams at all, for they are liable to break.

In building steam dryers great care must be taken with every joint or rivet, otherwise the contraction and expansion will soon cause the joints and rivets to leak.

In drying any and all kinds of minerals they should first be broken or crushed into two inch cubes or less, as it does not pay to dry large pieces of anything—so let it be understood that all material is supposed to have been crushed before entering the dryer.

It is difficult to dry anything in a body; it is necessary to have as large heating surface as possible, and to keep the material being

dried constantly in motion, cascading through the heat and dropping on other hot surfaces, so that the heat can easily penetrate through a thin body of material, carrying off the moisture.

The cost of drying minerals depends, first, upon the amount of water or moisture contained therein. In other words, concentrates, ores, or silica substances will not carry more than 10 to 12 per cent moisture, while clays and marls will carry two or three times as much, and peat will sometimes have as much as 80 per cent moisture. It is generally safe to estimate on evaporating 10 pounds of water for one pound of coal used, or its equivalent, when drying concentrates, ores, limestones and other similar products, where the products of the fire can pass through the material to be dried; therefore, it will be readily seen that it will not pay to dry any kind of material containing 80 per cent moisture, unless it be very valuable. It can be dried, but the cost of doing it will be more than the finished product is worth.

To illustrate: We wish to dry peat—we start with 100 tons of peat, containing 80 per cent moisture, and reduce to 5 per cent, which means to evaporate 75 tons of water, leaving 25 tons of dried peat. It will take one pound of coal, or its equivalent for fuel, to evaporate 10 pounds of moisture, which means no less than 15,000 pounds of coal for fuel to dry the 100 tons of peat, and it is difficult in drying peat to evaporate 10 pounds of moisture with one pound of coal, or its equivalent used, for the reason that after it is nearly dry it becomes somewhat combustible and is liable to burn, consequently it requires slow firing, otherwise you will burn it up.

I wish to speak particularly about peat, for the reason that there are a lot of learned fellows who honestly believe that it is an easy matter to dry two or three hundred tons of peat a day, that by some peculiar system and manner it can be dried very cheaply, and I wish to say to all such that they had better go slow, for it is much easier to say than to do. You might far better store the peat in large sheds, or even out of doors, where it will drain and dry by the winds and sun down to 40 per cent moisture, after which it can be profitably dried on mechanical dryers.

It is quite a different matter to dry 100 tons of concentrates, ores, or silica substances, for here we have only from 8 to 12 per cent moisture, which we wish to reduce to 2 per cent or which means about six or seven tons of moisture, requiring about 1500 pounds of coal, or its equivalent, to dry it, which is really a very small factor, and as the freight rates are frequently very high, especially in the mountain regions, it will pay to dry out the moisture before shipping. In other words, it does not pay to ship water in ores and concentrates if the cost of drying them is less than the cost of freight.

The second important matter as to the cost of drying minerals is whether the minerals to be dried will admit of passing the products of the fire through the minerals or not without injury. In other words, it will be readily seen that better results can be obtained from the same amount of fuel by first passing the heat around the outside of the drying cylinders, then through the material. By this means, the temperature of the gases passing off, the dryer can be brought down to 125 degrees Fahrenheit, which of course means that nearly the entire heat of the coal, or its equivalent it utilized, but if used on the outside of the drying cylinder only, not quite so good results can be obtained.

Most minerals, such as concentrates, ores, and clays, are not injured, by passing the products of combustion through them. Some fine clays and even some kinds of sand, used for glassware, will not admit of it, on account of the danger of coloration by the fire products. In all such cases it is necessary to use oil or gas for fuel, or to keep the products of combustion on the outside only.

The third important feature is, whether the material to be dried is of silica or clay nature. If it is of a silica nature, the moisture is easily given off, if of a clay nature, it will be more difficult to evapor-



ate the moisture, besides the sticky material is liable to adhere to the parts of the dryer, causing trouble, and consequently is more expensive to dry. It is seldom, however, that anything will stick to a heated surface.

The next, or fourth feature as to the cost of drying, is whether the material is of an explosive nature, or whether there is danger of burning, such as coal, peat and similar materials. If so, the heat must be of a low degree. There is no danger of burning anything, when it contains a considerable amount of moisture, and finishing on another dryer with light firing.

The fifth feature, regarding cost of drying, is whether it be necessary to dry down to a very low degree of moisture, in other words it is much harder and more expensive, to dry down to one-half per cent. than to two per cent. Generally speaking, however, it is not necessary to go below from two to five per cent. on most materials.

### DRYING COAL.

Coal is one of the most peculiar and interesting of all the materials that we have to dry. With some materials, it is simply to drive off the moisture, in others, to drive off the moisture and not injure the color, while with coal, the object is to drive off the moisture, and preserve the gases, also the fine particles, which are the most valuable parts of the coal.

The use of the Rotary Kilns, for roasting ores and for burning Portland cement, has of late years increased very rapidly, and the use of powdered coal in annealing furnaces, and also the use of coal, in a pulverized state, under boilers has caused a rapidly increased demand for pulverized coal. From observations taken during the last year, I fully believe that in all large and medium sized plants, the power will be supplied with coal dust, burned similar to gas. I feel sure that this is the only way to get perfect combustion, and that a very large saving can be made by using coal dust. This branch of the subject, however, is distinct by itself and cannot be treated in this paper.

Coal, to be satisfactorily and economically pulverized, should first be thoroughly dry. To get the best results from grinding machinery, there should not be more than one per cent moisture in the coal. The grinding capacity of mills is nearly double on coal of one per cent. moisture to what it is with moisture of two per cent. There can be no set rule to be followed in drying coal, as it is rarely that we find two lots of coal which will dry alike. Some coal will give up its moisture easily and freely, and other grades will apparently grow wetter as they grow hotter. Within the past six months we have been called upon to dry in one dryer, coal from which we could remove eight per cent. moisture at the rate of 15 tons per hour, and other coal from which it was impossible to remove more than six per cent. at the rate of 8 tons per hour. We have seen coal which has lain under cover for two months, develop from six per cent. to eight per cent. moisture on being heated, and put into the storage bins, and have seen water run in a stream from the hopper.

From the best determinations we have been able to make, it seems that coal in which the ash is composed largely of silica, will give up its moisture easily and thoroughly, while that in which the ash is high in lime or clay, is very difficult to dry, and the moisture really has to be sweated out.

It is very important that coal be handled in such a way, that warm air in large quantities, can be brought in contact with every particle of it, and can be made to absorb the moisture, and carry it off as fast as it is released. This is best accomplished by passing the currents of air from the dried material, through that which is wet. Furthermore, the currents of air should be subject to regulation, in order that the heat will not become so intense as to release any of the volatile matter.

There is no question, but what there is always a certain amount of risk in handling coal, both in drying and pulverizing, but this can be reduced to a minimum by using the proper precautions. The first and greatest precaution, is not to get the idea that "Any Old Thing" is good enough to dry coal. One notable experiment of this kind, in the east, during the last year, cost the lives of seven men, besides a large loss of property. Another point: Do not use a dryer in which particles can get caught, for they are liable to ignite, if held in contact with a heated surface for any length of time. Do not use a dryer, whose rated capacity is just enough to supply your needs. Better with this, as with all other machinery, to have it large enough to be able to do a little more, than to be obliged to force things on regular work.

Still another point: It is never safe to pass the products of combustion through the drying coal. With some coal it might be done, and in fact has been done with coal of 54 degrees volatility. It is best, however, to stay on the safe side, and not sacrifice safety for efficiency.

It is generally safe to estimate on evaporating from six to eight pounds of moisture to one pound of coal, or its equivalent used for fuel.

I have heard of evaporating as high as 12 pounds of moisture with one pound of coal, but I have the best of reasons to doubt it.

It is difficult to tell at just what temperature, coal will begin to give off gas, and indeed this point varies with different coal, but it is generally safe to say that it can be delivered from the dryer at about 150 degrees Fahrenheit without loss of gas. We have been asked to discharge at 225 degrees and have found that this can be done but not without loss of a small percentage of gas, and this cannot be recommended as good practice.

It is necessary to use a fan-blast to get sufficient air, to carry off the moisture, and this will carry the dust produced by crushing with it. This dust amounts to from 3 to 5 per cent of the total amount, and is worth saving. This is accomplished by placing the fan-blast above the receiving hopper, using suction on the cylinder and forcing the dust and moisture into a settling chamber, made of non-conducting material, preferably brick. The wall of this chamber will retain sufficient heat to prevent the moisture from condensing, and should be large enough to allow the dust to settle. The bottom of the settling chamber should slant at least 45 degrees to the center, which will cause the dust to slide to the middle, where it can be carried off, either by screw or chain conveyor.

**PRESIDENT RICHARDS:** I will state at this moment that Mr. Holmes, who was to address you this evening, said that he would not occupy more than ten or fifteen minutes and suggested he would do that in the morning. I told him I thought that would be agreeable to the Congress and there being no other papers to be read, there will be no need of further business tonight.

**MR. MARTIN, OF SOUTH DAKOTA:** Would it not be better to have Mr. Dignowity's paper or whatever it is at some time tomorrow, in the hope that we might have more suitable weather and a chance for a better gathering?

**PRESIDENT RICHARDS:** Would it please you, Mr. Dignowity, to do it that way?

**MR. DIGNOWITY:** It will make no difference to me.

**MR. MARTIN, OF SOUTH DAKOTA:** The Committee on Resolutions has further reports it can make at this time or some other time at the pleasure of the Congress.

**PRESIDENT RICHARDS:** We will listen to the report.



MR. MARTIN, OF SOUTH DAKOTA: The resolution introduced by Mr. Drake, of Oregon, upon the subject of the acquisition of the Oregon territory and the exposition in Portland in 1905 has been adopted by the committee and recommended to the Congress with the exception of the reference in that resolution to the holding of the American Mining Congress in Portland or in the vicinity in 1905, that we have eliminated, deeming it best to leave the whole subject to this Congress to be determined at the proper time.

It was moved by Mr. Drake, of Oregon, and seconded by Colonel George, of South Dakota, that the resolution, as amended, be adopted which motion was carried.

MR. MARTIN, OF SOUTH DAKOTA: The resolution of Mr. Bennett, which was read a short time ago, upon the subject of the exploitation of valueless mining stocks, has been under consideration by the committee, and the committee recommends a substitute for the resolution offered. It is as follows:

MR. BENNETT: The substitute is perfectly satisfactory to me and I move its adoption.

The adoption was duly seconded and the substitute resolution was adopted.

MR. DONALDSON, OF COLORADO: I move you that by rising vote we extend our thanks to those who have given us papers this afternoon.

The motion was seconded and unanimously carried by rising vote.

PRESIDENT RICHARDS: Senator Morgan, of Alabama, in answer to the invitation of the Secretary, wrote a letter which perhaps you would like to hear, in answer to the invitation and the Secretary will read that portion of it which pertains to the Congress, with your permission for a moment. The letter is as follows:

Warm Springs, Virginia, August 15, 1903.

Mr. Irwin Mahon, Secretary of the American Mining Congress;

Dear Sir:—The invitation, extended through you as Secretary, to attend the sixth annual meeting of the American Mining Congress, on the 7th of September, is very highly appreciated and would be gladly accepted if I could be present.

Other public duties will, however, deprive me of the opportunity to witness the proceedings of an assemblage, that is second to none of the movements of our people, in their efforts to promote and secure the general welfare.

I deeply regret that I must forego so excellent an opportunity to gain the knowledge that will be placed in reach of, even, a casual observer on that occasion, relating to mines, metals and metallurgy which, today, are far more important to our country than they have ever been.

The subjects that are included in the field of research and the other work of the American Mining Congress, are at the foundation of every important industry, and are at the beginning of all real progress in civilization.

The minerals and metals are the actual, elementary predicate of all useful labors in all the economic arts and they are the indispensable agents, instruments and facilities of all practical science.

No effort, that is sincere and thoughtful, in the study and manipulation of minerals and metals, can ever fail to benefit mankind; because each failure to realize their best uses and the best method of treatment, is a guide that points the inquirer to a more certain course of investigation, until the best results are finally reached. Failure, in one direction, is only proof that success lies in a different direction.

It is the purpose of such scientific inquiry to develop the laws that will save the prospector, the miner and the metallurgist, the

heavy cost and the disappointments of wasted time, labor and capital, which are so frequently met; and the wastage of minerals that, once they are lost, are seldom recovered. For, the store of minerals in land and water, when it is lessened, from any cause, is not capable of being replaced by all the art and wisdom of men.

In this vast field, in which the American Mining Congress has assumed a work that is so important, its interests and its present duty are more conspicuous, than it was ever before, in making mining pursuits of permanent value to all who are engaged in such industries and to all who are employed in all other industrial enterprises.

This Congress, in our free and very great country, has the power to perform this duty, effectually, through the guidance it can give to scientific research, to practical demonstration, and to the governmental action of those who, as representatives of the people, are charged with the duties of legislation in the Congress of the United States, with reference to gold and silver in their capacity, as money.

As I view this subject, in connection with the industrial, financial and social conditions in American and, more particularly, in the United States, the American Mining Congress is now in the position to secure permanent and supreme advantages and blessings to all classes of industrial people, in all the vast diversity of their pursuits.

The power to which I refer, is that imperial and autocratic sway, and social conditions in America, and, more particularly, in the future by gold and silver in controlling men and nations. They are the magnets that guide the voyages of all the ships of state, and will, forever mark their courses.

The "drill" and the "pick" of the miner resurrect his power from the deep and hidden recesses where it has been buried by the hand of the Creator, for the use of man, and set apart by Divine Wisdom as an essential factor in his dominion over all other creatures.

These carefully stored reserves of power are the true, vital factors in all the social, governmental, moral and industrial progress, that is included in true civilization; whose march would come to a dead halt, in the absence of the compelling power of gold and silver money.

There are no potentates so powerful in their sovereignty, as money coined from these metals and none who can wear this dual crown of supremacy, by "divine right," or by any other means than the drill and the pick of the miner.

No civilized state can exist; no army or navy can be formed or moved; no civil or penal code can be enforced; no interchange of commerce, among men, or nations, can be conducted; no trade contract can be legally enforced; no schools, or churches can be supported without the use of one or both of these metals.

The miners toil is, therefore, the supremest form of labor.

These two metals, that are almost barren of practical usefulness, for the supply of our physical wants, are placed above all other things in estimated value, by the universal consent of men and nations.

It was so in the beginning. It has continued through all time, and it will so continue to the end.

The unwritten law that governs all the world, has made them the supreme ruling powers in the affairs of actual life, and in all government, with a sovereign power that no autocrat can deny or successfully resist.

Whether these unchanging conditions are fixed and proclaimed in the revealed will of God, or whether they are the contrivances of men it is, perhaps, needless to enquire; but it is certain that they cannot be changed by the power of man, so as to destroy the precious quality of gold and silver as money metals.

It is their quality, as money metals, that is indestructible and precious. They possess no other quality that is even important to mankind.



No nation has openly attempted to destroy this precious quality, of either of these metals, and none will ever do so, effectually. They will outlive all opposition and defy destruction, while they scorn the neglect of nations.

With these facts, established in the judgment and with the consent of all civilized mankind, in all ages, it seems to be a heresy against the order of nature, to attempt to deprive either gold or silver, of its precious quality as a money metal.

It is equally disparaging to the law of equal personal rights and privileges, accorded to all men, the right to exist, and the right to the pursuit of happiness, that we should so legislate, and so discriminate, as to make silver the cheaper money of labor, and gold the money of those who live on the labor of others, instead of living by the labor of their own hands.

This is done, when the coinage laws and the legal-tender laws discriminate against silver, as a money metal, or as a legal-tender for debts.

Our laws make these discriminations, by refusing equal privileges to silver, in the coinage of money, and by limiting the legal-tender power of silver coins.

Whatever privileges of coinage are given to one metal, should be given to the other; and the rule should be the same and not different as to the legal-tender power of gold and silver coins.

It is the constitutional right of Congress to provide for the coinage of money, and to regulate its value, as between these metals, but it is not within the constitutional authority to destroy the value of either, by its legislation.

Congress can fix the relative value of the coins of either metal, according to weight and fineness, but when the coins are struck, Congress cannot change the value of a gold dollar, or a silver dollar, by discriminating between them as to their purchasing power, or debt paying power, or by legal-tender laws that lessen either coin below the value stamped on its face.

We make these discriminations against silver, both in our coinage regulations and in our legal-tender laws and we, thereby, discriminate against silver and destroy its precious quality as a money metal.

We do, by indirection, what no nation dares to do by open and repressive legislation, at the peril of the safety of its government.

A law to punish the use of silver money in trade, as a crime, would wreck the most powerful nation in the world, because it would starve the poorer classes; and a law that gives to gold a purchasing and debt-paying power, that it refuses to silver, would destroy any government, but for the fact that in order to prevent the resentment of the people, in all countries where such discrimination exists, the full legal-tender power of silver coin is conceded to them as to the smaller transactions that are necessary to supply the poor with bread, raiment and shelter. Their daily necessities do not mount up to the forbidden line, above which, gold is a legal-tender, and silver is not. Having no hope of rising into the upper atmosphere where the holders of accumulated wealth enjoy dominion, they prefer humility and peace.

The people are thus classified by law, according to wealth. They do not rebel because they despair of becoming rich, and are content to live on a moderate share of food, raiment and shelter, which they have no real power to increase.

These conditions are inimical to silver, as a money metal, and they violate the natural and economical laws, that have always assisted, most effectively, in the civilization of the world.

For the justification of such a policy, we must impeach the Divine Wisdom that created two precious money metals for the use of mankind, when one of them would have answered all the uses of both, according to our feeble conceptions of omniscience.

With equal presumption, we could, as well impeach the wisdom of creating many cereals to provide bread for mankind—such as wheat,

corn and rice—when either of them could have been made to supply necessary food for man and beast.

A short supply of either precious metal, at once increases the value of the other, to meet the deficiency; and a full supply of both, is never excessive, but only adds to the volume of the world's trade, the discovery and production of new and desirable articles of commerce, which absorb the apparent redundancy of money and add to the comfort and elevation of mankind, by providing additional methods of replenishing the earth, so as to multiply its population.

The miner's "pick" and "drill," which are the real producers of gold and silver, in the hands of the laborer, are too slow and toilsome to be resorted to for the purpose of inflating the supply of gold and silver coin and they cannot cause such inflation, even in countries that are as thinly populated as the Transvaal or Australia or Alaska, where the production of gold is so disproportionate to the local demand.

The danger of the inflation of gold and silver is an argument that has no support in the experience of mankind. There is as much danger of piling up the waters of the oceans, in permanent mountain ridges, as there is of making gold and silver accumulate in any country where they are not needed to supply the wants of trade and civilization.

The highest wisdom of men and of nations is to leave the laws of nature undisturbed, and to make the best use of things that are provided by the Creator to promote and secure man's dominion of the earth; and the worst folly, is to destroy or cast aside what has been given us for any useful purpose.

In the American sense, this sort of folly is not only suicidal, but it is craven, when it disparages silver as a money metal, because, while the Eastern Hemisphere has, possibly, the lead of the Western Hemisphere, in gold producing areas; the Western Hemisphere is, in fact, almost the exclusive depository of silver ores.

The rights of silver as a money metal are, therefore, the especial care and charge of the American Mining Congress, within the purview of their noble task.

If legislative favoritism should be shown to any class, in respect of gold or silver, the miner should have the preference; because he produces the precious metals that drive the machinery and strengthen the arms of all industry.

When the miner puts a dollar in circulation its work never ceases, and the good it accomplishes is limited to no class or condition of people; while the covetous hoarder of wealth, who demands the assistance of unjust laws to satisfy his greed, produces nothing but discord and oppression, through the unnatural war between gold and silver, which he provokes.

He cares not whether gold or silver wins, so that he has a share in looting the camp of the defeated combatant.

Such unjust contentions necessarily establish lines of cleavage between the richer and the poorer classes, or between the wise and the ignorant, in "business methods," (as is sometimes contended) that divide the people into warring classes, such as are now demarking the line of a social gulf, that is as deep and as wide as the gulf which separated Dives from Lazarus.

These laws should be changed and the peace and friendship between gold and silver should be restored to the condition that existed during the first half century of our national life.

As our system of finance is now regulated by law, if a laborer does a days work, to be paid in coin; when his wage is due, he must accept it in silver coin, because the coinage of gold dollars is abolished.

If he thus accumulates fifty dollars, to pay a debt, or to support a family beyond the seas, he must change the money into gold coin, or he must purchase exchange. In either case he is at the mercy of the bankers or brokers who deal in money as a commodity of commerce.



The losses and disadvantages that are imposed upon the poorer classes, by our laws that discriminate against silver as to coinage and as to legal-tender power, appear in almost every transaction in which they engage.

They are too numerous for recital, and far too obvious for denial.

We cannot change, by our laws, the money systems of foreign countries and, while we could do much in that direction, to give strength to silver—the American metal—we have no higher duty than to take care of our people, in their home work, by securing to them all the benefits of the silver and gold that are so richly stored in our mines.

To do this, we must change the basis of our present system of finance and national banking, so that our capital shall consist of gold and silver, actually accumulated; instead of resting it solely upon our national credit, based on the power of taxation, with pledges of national faith to provide the gold, or the gold and silver, to redeem our obligations, on demand, or when they shall fall due.

We must change our currency system from a credit basis to a specie basis of national banking, if we would make it just to all classes and independent of the power of monopolistic combines.

Our system of banking is constitutional, and it is convenient and secure, in that it provides for a reliable currency, but its foundation is not money, or bullion, but credit, wherein it is greatly defective. This credit depends upon our power to redeem our promises in coin, to be hereafter borrowed, or collected under laws of taxation. This system is false and unjust to the living, and is still more unjust to our posterity.

It is not our own credit that we pledge to meet these engagements so much as it is the credit of our posterity. If the system is to be perpetual, we fasten upon our posterity a burden from which they cannot escape. This burden is simply the perpetual and exclusive right to measure out to all coming generations the volume of paper money they shall be permitted to use in their business and, unavoidably, the power to inflate or contract that currency as the bankers may choose. This power to create first money is thus assumed by congress, in violation of the constitution.

Our national banking system was instituted to build up the national credit, by the employment of the credit of private persons at a time when our national obligations were nearly 50 per cent below par, in consequence of civil war.

The national credit, we have thus seen, is liable to very heavy depression under political troubles. It is not safe to assume that financial depression can never again occur. If such depression should occur, they will bankrupt the people, by dragging down the whole volume of national bank circulation to the extent that the national credit is depressed.

We want a currency that will withstand all such emergencies, and such currency can only be had by founding it upon a specie basis and keeping that basis secure.

All our actual currency, which is handled by our people in their daily business, is in paper promises, except silver coins, and an inconsiderable quantity of gold coins, and it will never be otherwise.

Bank issues and checks against deposits in the banks comprise nearly the entire volume of our money in circulation. There is no prospect of an entire change of our actual currency from paper money to coins, because there is no good reason for the suppression of such paper issues. The inconvenience of using gold coins in our daily trade can only be avoided by the use of paper money, or silver coins, and paper money has become a necessity in our country.

Paper issues, to circulate as money, must, therefore, be provided as an essential part of our financial system and the basis of such issues should be gold and silver, instead of national bonds or debentures, which ultimately require coins of the precious metals for their redemption.

It is not only safer to deposit coins as the basis of banking, in advance of the paper issues they must redeem, but there is no national power that is so permanent, and no national attitude that is more commanding, than that of possessing an abundant store of gold and silver coins, in banks, that are under the control of the government.

A government is not deserving of confidence if its failure, by revolution, or conquest, must be attended with the bankruptcy of its people.

Our national banking system on a permanent specie basis, would be a stronger system than that of Great Britain, in connection with the Bank of England, because our deposit of coin would be held in the treasury, or subject to the control of the government, for the redemption of the issues of the national bank, and our pledge of redemption would make every legal tender coin, of either metal, equal to the best, whether the best is gold or silver.

As the situation is at present we exclude silver from all participation in the redemption of our national promises, except those made in silver certificates, and, thereby we demonetize silver.

We refuse to accept its support of the public credit, while we compel our own people to accept it as legal tender for small demands and tax them to borrow gold for the payment of our large debts, for bonds and currency, in favor of wealthy creditors here and in foreign countries.

We borrow gold and lock it in the treasury, paying interest on it in order to prepare to meet demands for the redemption of treasury notes and national bank notes, wherever they may, hereafter, be presented for payment. We create an insurance fund for the benefit of creditors, on which we pay interest.

We also lock up the gold we get from our revenue laws, for these purposes; thus depleting the currency that ought to be in circulation, while waiting the pleasure of our bond holders to demand payment so as to release it from confinement. We put a golden break on the endless chain that empties the treasury into the lap of Europe, and refuse all assistance from silver, because it is only the poorer people of Europe who want silver. We produce the silver in America that the world needs for coinage, and refuse to use it as money, because it is for the advantage of European capitalists that money should be scarce, that bonds should be abundant, even at low rates of interest, and should be payable in gold because such payment is impossible, and their investment in the tax paying power of the people will, thereby, become permanent. We conform our financial system to that of Europe because our capitalists prefer it, for like reasons.

While doing this, we take silver dollars on deposit, from our own people, issue silver certificates to them to circulate as money, to supply nearly all their needs and we pay nearly all the expenses of the government in these certificates.

That they have so frequently saved the government from default in its current expenses, is a conclusive reason for the use of silver coins, in the vaults of the national banks, or in the treasury vaults, to fortify the basis of redemption of bank issues, which it would do, as perfectly, as if it were gold.

All of our paper obligations, in all their varied forms, except silver certificates, are now sustained by the pledge of the United States to pay them in gold coin. Yet silver coin, with an emasculated legal tender power, as compared with gold, has a much wider circulation, dollar for dollar, among our people, and is sustained in its purchasing power, among all our industrial classes, by the imperative demand of all forms of domestic trade for silver coins, to meet the requirements of their business, and to purchase the necessities of life. They get silver coins and use them, despite the effort of the holders of gold to destroy their value. If they could not get the silver coin of the United States, they would use the Mexican coins, as is done by the Chinese and Filipinos.



No man in this country is so rich that he can dispense with the use of silver coin in providing his supplies and, to the poor, it is the equivalent of their daily bread, raiment and shelter.

But our laws discredit both gold and silver, as the basis of all banking, by prohibiting issues of paper money by private and state banks, and by refusing charters to national banks on any basis except that of national bonds.

This is a revolution and new departure in finance, that no other great nation has ventured upon. No other great nation has seemed willing to inflict almost universal bankruptcy on its people, if the exigencies to which they are exposed should cause their credit to sink below par.

This has been attempted by some of our states, with the result of a discredited currency, followed by bankruptcy and repudiation, with enormous losses to the people and, in the end, by "asset" banking, on private credits and worthless promises, culminating in the financial degeneracy of issuing certificates of indebtedness by private persons, known as "shin plasters," to circulate as money.

It is only the present growth, prosperity, prestige and power of the United States that gives to its credit the strength to prevent a similar lapse in the value of our national bank issues. If we were financially as weak as Colombia, or as the confederate states became towards the close of the civil war, our bank issues would drop to a low standard of value as our credit had dropped, at the same period.

No nation has a sufficient assurance of continued power to give a moral justification to laws that substitute its credit for the precious metals, as the basis of industry, trade and commerce. We adopted this false system of national finance, to meet the necessities of a terrible civil war, and we continued it, to meet the demands of a coalition between the brigands of finance in our country with those of Europe.

They have used the national debts of European states, enormously swollen by the results of great wars that were fought to destroy the old feudal system of land tenures and villenage, and they have transferred its powers and its arrogant supremacy to the holders of consols and rents, and have turned over the authority of its overseers to opepor and collectors of taxes, to gather the substance of the toiling, industrial classes, who are doomed to subordination and poverty.

The same interests, moved by the same purpose of subordinating industry to the demands of hoarded wealth and employing the tax laws as the instruments to enforce their requisitions, have planned to keep our laboring classes in perpetual subordination, by increasing the national debt of the United States, and by making their burdens perpetual.

Gold and silver alike stand up to resist this power to oppress, that is given to credit, in the form of bonds, which is also converted into current money; and the friends of sound money protest, and will forever decry this unnatural perversion of the chiefest temporal blessing that God has given to man.

If we would prosper we must restore to the precious metals their supremacy as money.

The joint resistance of the precious metals, to the usurpation of those who are powerful enough to own the public debt, is rendered futile by the plan of the monopolists (which is so far successful) to divide gold and silver into competitive antagonists, and to place it beyond the power of a single metal ever to pay the public debt.

The plan to increase and perpetuate the public debt, payable in gold, is backed by organized capital, including the national banks throughout the country.

Gold, representing the power of the organized few, against silver, representing the power of the unorganized masses, is easily employed and controlled in the work of destroying the equal power of silver as a money metal, and silver is thereby made useless in the

struggle of the people to pay the national debts, and to escape taxation. This is simply the old burden of feudal servitude, in a new form.

Gold, in such conditions, is also made, by our laws, the sole arbiter of the price, or value, of all the leading fruits of industry, and the laborer earning money with limited purchasing power, is deprived of all hope of becoming independent of his master—the gilded capitalist.

Of course, it is now an established fact that all the gold and silver in the Eastern Hemisphere is not equal to the payment of the debts of those nations, if it was applied to their discharge.

This means the salvery of industry to capital, which is to be perpetual.

In America the conditions are not so desperate, as yet, because the balances of trade in our favor have enabled us to reduce the sum of our national debt and, until recently, the imperialists, who make gold their scepter-power, have not been bold enough to declare that its sway shall be perpetual.

Now the monometalists feel strong enough to propose the increase of the power of our national debt, as the capital of national banking, by permitting such banks to issue more than dollar for dollar, in paper money, upon the face of the bonds held by them. This can only mean the perpetuity of our bonded debt, as a principle of government, and its conversion into a substitute for gold and silver money, thereby adding 50 per cent to the burden of our debt, and creating a permanent necessity for the taxation of the people to pay interest on it.

This tempting fallacy of banking on the basis of credit, instead of gold and silver in the bank vaults, drives others of the monopolistic class into "asset banking," which opens the door to the wildest projects that have ever found practical and disastrous illustration in the frauds, bankruptcies and ruin inflicted upon the people by the licentious abuse of their confidence, and the grind of their necessities, in the issue of "wild cat" and "pigeon roost" currency to circulate as money.

It would require a long and very disgraceful chapter in our history to record these desperate banking operations.

The citation of the specific facts of history is not needed to remind our people of these sad years of ruin, that involved states and people in the trouble and disgrace of a system of banking that was based on credit, instead of gold and silver.

Our system of national banking based exclusively on the national credit, being unsound, dangerous and oppressive to tax payers, the simple and effective remedy is found in the payment of the national debt, and the substitution of gold and silver, in place of the debt, as the basis of national banking.

The exclusive legislative control of all banks of issue and redemption should be exercised by congress, as is now the practical situation. Congress should, therefore, provide for the payment of the national debt and for the substitution of gold and silver in place of that debt as the capital of all national banks.

If we intend to keep our promises to the world, and especially to our own people, we will pay our national debt at the earliest practicable time. And if congress has any such purpose, it will not hesitate at once to declare it, and to provide for its execution as a settled policy of our government.

When this debt was created this promise was made to our tax payers and the sacred pledge was given to our posterity that the national debt should be paid as soon as it was possible.

It is contrary to all just conceptions of the character of the free, self governing and sovereign people of the United States that congress should create such debts; saddle them upon posterity, mortgage the labor of our children for their payment; foster and protect favored classes, by exempting them from taxation on that class of property; and then, in the face of such solemn pledges to the con-



trary, maintain the debt, in perpetuity; increase its volume and fasten it, as an irrevocable tax burden, on the present and future generations, by making the debt the only basis for the supply of the people with the paper currency, which is indispensable to all their industrial pursuits. It cannot be just to starve the industries of the country, unless the people will agree to pay taxes for the benefit of favored classes.

A system thus founded upon the basis of broken pledges; that gives to gold the utmost power; and dedicates it to the service of the brigands of the stock markets and the feudal lords of finance: while it destroys the purchasing and debt paying power of silver, is a system that no true American can consent to tolerate longer than it can be safely changed.

It should be impossible that the national debt should be perpetual; and its payment will remove the whole foundation on which the national banking system rests. There will never be a time when this necessary change will be made more easily, or with greater advantage to the country. We have reached the point when our financial system will destroy the country, or will save it.

It requires at least 6 per cent per annum to be raised by taxation to pay the interest on the face value of the bonds of the United States, now held by the national banks, and to meet the loss in the public revenues, state and federal, that is caused by the exemption of such bonds from all taxation.

The premium on these bonds is at the rate of from 6 to 9 per cent, in the money markets.

This includes interest at 2 per cent, tax exemptions, estimated at 4 per cent, and the convenience of holding bonds as a safe investment, estimated at 1 to 3 per cent.

This premium would equal the face value of the bonds in about eleven to fifteen years, thereby doubling the debt in such period.

This advantage, given to the holders of our bonds, added to the advantage of circulating the face value of the bonds in the form of national bank notes, redeemable by the government in gold coin, and loaned to the people at extortionate rates, adds enormously to their value, as an exclusive privilege granted to capitalists. The perpetuity of such a system is impossible and it should be now abandoned.

All this results from a system that excludes gold and silver from the basis of banking, by adopting the national credit as the sole basis.

These special privileges cannot be long maintained against the will of the people, when they understand the oppressive burden of injustice it imposes upon them.

We can pay the bonds now held by the national banks in gold, without the least strain upon the country, in ten years, or even in five years, and require them, on pain of forfeiting their charters, to deposit the amount of the bonds held by them, in their own vaults, in the treasury of the United States in coin, as banking capital.

We can go much further, with benefit to the banks and with great relief to the country, by accepting silver legal tender coins, on deposit, as banking capital, in sums equal to the deposits of gold or bullion, or approximately equal.

Under such conditions the banks could have no real inducement for refusing such silver coins in payment of their bonds, or, say, one half of the amount.

A distinct forward step would be taken in the rehabilitation of silver money, in its commercial value as money of redemption, if it was united with gold, as capital, in the national banks.

We are now employing large sums of silver coin, deposited in the treasury to redeem silver certificates in circulation as money, and with such benefit to the country that the repeal of that law would cause distress to the people and the government.

The transfer of such coins to the banks would not injure the credit of bank notes issued, as silver certificates are now issued upon their value as money and, if the option is given to the holders of na-

tional bank notes so issued, to demand redemption, in gold, at the bank of issue, with the obligation of the government to redeem them in gold, if the bank of issue refuses so to redeem them, every dollar of silver so deposited would perform all the functions of a dollar of gold, and, together, they would form an equal support to our national bank, paper money.

Such an option, given to the holders of national bank notes, could not in the least expose the banks or the government to the combination of speculators in money, to deprive the banks of their gold.

The necessity for making the demand for gold, at the bank of issue, would prevent the raiders from concerted action, or possible success in any effort to withdraw gold from the country and ship it back and forth, across the oceans, as a commodity of commerce, as is now being done, to settle the balance of trade, or the losses, or winnings, of the gambling schemes of dealers in stocks.

It is, in fact, to this inferior function that we have degraded gold, by robbing it of its higher office of supporting the credit of our own currency, and strengthening our home industries, and by using it as a commercial commodity, in settling our balances of trade and the gambling debts of stock brokers.

The true wealth of our country, as it is of all countries, depends upon thrift, and the prosperity of our industries, accompanied with permanent stores of the precious metals, sufficient to prevent injurious depression in trade through our lack of a full supply of money for proper purposes.

No country can suffer, or be disturbed in its industries, by panics, that maintains a safe reserve of precious metals for the use of its people, as money.

Such a policy is not a hoarding of idle wealth, but the accumulation of financial power, that gives prestige to a nation and security to its people.

If we place gold and silver, as the foundation of our currency, in national banks controlled by our government, and pledge the faith of the government to the redemption of the issues of the banks in gold and silver coins, at the option of the holder, these depositories, instead of being raided and depleted by speculators in coin and closed by panics created for the purpose, will increase with the growth of our country and will put capital at work for the benefit of the people.

Such a system, with balances of foreign trade in our favor, will cause a steady and immeasurable increase of wealth, in which every citizen will have the full share that is due to honest industry.

The battles of "the standards" will cease, and the ratio between the metals, according to weight, will cease to trouble, and the purchasing power and the debt paying power of the metals will all be adjusted by the value of the currency they represent and support and, in all these fluctuations, they will work together for the good of the country.

The paper currency issued upon a joint specie basis of gold and silver will always represent the highest relative value that any country can attribute to gold, or to silver; and such paper issues, guaranteed by the government, as to its redemption in gold or silver at the option of the holder, will be as good as the best money that any country can supply, and it will be current, without discount, in all the commercial countries.

If we change our system of banking, from a credit basis to a cash basis, using the precious metals for its foundation, and the credit of the government to insure its integrity, we will forever close the door upon the bickerings that cause distrust, antagonism and panics in our financial affairs.

The payment of the national debt will clear the way for the adoption of a system of finance that will compose all our difficulties and give confidence to all who toil and will secure the permanent welfare of the country.



All proper financial reform, in our present sad condition, depends upon this predicate, and I most respectfully, and with entire confidence, present this as the question that is entitled to the immediate and most careful consideration of the American Mining Congress.

The results that must follow the correct settlement of this long, unnecessary and unhappy contest as to use of gold and silver as money metals, on the terms of just equality, are so important, that I cannot conceive of a higher honor that the Mining Congress could achieve, than to lead in its final adjustment.

With great respect,

JOHN T. MORGAN.

MR. GEORGE, OF SOUTH DAKOTA: I move we adjourn to meet tomorrow at 9:30 A. M. at the City Hall at Deadwood.

The motion was seconded and carried and Congress adjourned to September 12th, 1903, at 9:30 A. M.

Deadwood, South Dakota, September 12th, 1903, 9:30 A. M.

PRESIDENT RICHARDS: Congress will be in order.

PRESIDENT RICHARDS: If there is no objection we will take up first any communications the secretary may have on his table.

Secretary Mahon read a letter from Fred J. Kiesel with reference to the National Irrigation Congress, as follows:

I have here which I merely will submit to you letters in connection with the American Mining Congress, extending congratulations from nearly every civilized nation in the world. I have also letters here from all the departments at Washington, with that of an additional letter from the president of the United States. I have letters here from nearly every United States senator. I have complimentary letters from the greater portion of our representatives in congress or the lower house. I will not read them, except the first one, from our ex-president, L. Bradford Prince. Here is also another package of letters from distinguished men all over the country, which I will submit to our stenographer who will include them all in the publication of the proceedings of this session. There is also a letter from our ex-president, Mr. Schaffner, of Cleveland, Ohio, on the same lines as the one I read from ex-Governor Prince.

Ogden, Utah, Sept, 7th, 1903.

Judge J. R. Richards, care of American Mining Congress, Deadwood, S. D.

My Dear Sir:—We were delighted to hear through Mr. A. M. Moss, of Payette, that you will favor us with an address at this congress.

We are sending you, under separate cover, two posters advertising the congress, and would ask that you display same to the best possible advantage at Deadwood, and also read our official call, copy of which we inclose herewith, and extend an invitation to the delegates at the American Mining Congress to attend the 11th National Irrigation Congress. We would appreciate your compliance with these requests as a very great favor.

This congress is assuming now an international aspect; Spain, France and Mexico will all be represented here by officially appointed delegates, who are also students of irrigation.

Thanking you for your courtesy, very truly yours,

FRED J. KIESEL.

White House, Washington.

The president regrets his inability to accept the courteous invitation of the American Mining Congress to be present at its sixth annual session, September 7th-12th, 1903.

Grove, Hamilton Co., N. Y., July 28th, 1903.

Mr. Irwin Mahon, Secretary American Mining Congress, Deadwood.

Dear Sir: I regret very much that my engagements are such that it will be impossible for me to attend the Congress in September. I trust that the session may be productive of that great good which the Congress has it in its power to do by inviting the attention of the public to the important industries of mining and by making such suggestions to congress in Washington as may affect national legislation.

Very respectfully,

WILLIAM H. HUNT.

Mexico, Julio 15 de 1903.

Sr. J. H. Richards, Presidente The American Mining Congress, Deadwood and Lead, South Dakota, U. S. A.

Muy Distinguido Sr. Mio: Tuve el honor de recibir la atenta invitacion que se ha servido Ud. dirigirme para concurrir a la Sexta Sesion del Congreso que tan dignamente preside, la cual debera tener lugar del 7 al 12 de Septiembre proximo; y al tener la pena de manifestar a Ud. que no me sera posible asistir a dicha Sesion por impedirlo las atenciones del Despacho de la Secretaria de Guerra y Marina que es a mi cargo, me apresuro a dar a Ud. las mas cumplidas gracias por su galante atencion.

Con esta oportunidad, me es grato suscribirme de Ud. afmo. y atento seguro S. S.

J. F. MENA.

Chicago, July 15th, 1903.

Mr. J. H. Richards, Pres., The American Mining Congress, Deadwood and Lead, S. D., U. S. A.

Dear Sir:—I have the honor to receive your kind invitation to the sixth annual session of the American Mining Congress, over which you preside and which takes place from 7th to 12th of September.

I am sorry to say that it is impossible for me to attend the same Congress on account of the attention that the ministry of war and marine now under my charge demands.

Thanking you for your attention, I am,

Yours,

F. Z. MENA.

Santa Fe, New Mexico, Sept, 5, 1903.

To the President of the American Mining Congress.

Dear Sir:—It is with deep regret that at the last moment I find it impossible to attend the Congress, on account of business matters which cannot be postponed. Until within a day or two I have never doubted being present.

As an original member, and its first president, I naturally take a great interest in the success of the Congress, which is certainly one of the most important of our national gatherings.

I trust that this session may be fruitful of good results, especially in the modernizing of our mining laws, and in the establishment of a national Department of Mines.

With best wishes, respectfully yours,

L. BRADFORD PRINCE.



Carlisle, Pa., August 11, 1903.

Irwin Mahon, Secretary, Deadwood S. Dak.

My Dear Mr. Mahon:—Accept my thanks for the kind invitation to attend the next annual session of the American Mining Congress, to be held in Deadwood in September.

I had hoped to be able to attend the Congress, and would probably have done so if it were held during the summer, but on account of court business I am so busy here in September that I cannot leave without great inconvenience.

Hoping that the convention will be fraught with good results, and with kind regards for yourself, I remain,  
Yours very truly,

E. W. BIDDLE.

Springfield, Aug. 17th, 1903.

Mr. Irwin Mahon, Secretary to the American Mining Congress, Deadwood, S. Dak.

Dear Sir: I beg to acknowledge your kind invitation of some time ago to attend the session of your Congress at Deadwood and Lead.

I regret, however, to have to state that previous engagements for that date make it impossible for me to attend your meetings, much as I should desire to do so.  
Yours very truly,

C. H. CRANTZ.

St. Louis, August 26, 1903.

To the President and Members of the American Mining Congress,  
Deadwood, South Dakota.

Gentlemen:—The Business Men's League of St. Louis has the honor to invite the American Mining Congress to meet in St. Louis in 1904.

The great Louisiana Purchase Exposition will then be open, and the city in this and other respects will be most attractive. The hotel and hall facilities will be adequate and railway rates will be low.

Very truly yours,

WM. FLEWELLYN SAUNDERS,

JONATHAN RICE,

Secretary and General Manager.

President.

Saint Louis, August 26, 1903.

To the President of the American Mining Congress.

Sir:—On behalf of the Louisiana Purchase Exposition I desire to extend to the American Mining Congress a cordial invitation to hold the annual meeting of the association for 1904 in the city of St. Louis.

In that year will be held at Saint Louis the Universal Exposition in commemoration of the one hundredth anniversary of the purchase of Louisiana territory. The exposition management will be prepared to furnish without charge a satisfactory hall for the holding of the sessions of the association. The committee on ceremonies will, if desired, recognize the presence of the American Mining Congress by setting apart a special day, or by providing some distinctive feature of the program.

The information service, conducted without charge by the exposition management, will assist delegates in obtaining satisfactory accommodations at reasonable prices. The fair name of St. Louis for hospitality will not be marred in 1904. Assurances given by the railroads warrant the promise of very low rates in transportation.

Respectfully,

D. A. FRANCIS, President.

St. Louis, Mo., Aug. 25th, 1903.

To the President and Members, American Mining Congress, Deadwood, S. D.

Gentlemen:—In behalf of the city of St. Louis I take pleasure in extending to your association a cordial invitation to hold your meeting for the year 1904, in this city.

Yours truly,

J. S. KADDUSBY,

President of the Council and Acting Mayor.

Irwin Mahon, Esq., Sec.

My Dear Sir:—Please accept my thanks for the very polite and cordial invitation of the American Mining Congress to be with you at Deadwood and Lead at your coming annual session in September.

Absence in Europe makes it impossible for me to accept, but I none the less appreciate the compliment of your invitation and extend my most hearty wishes for a very successful gathering.

Believe I remain,

Yours very truly,

H. K. PORTER, 31st. Dist. of Pa.

St. Moritz, Switzerland, Aug. 6th, 1903.

Hacienda Del Pozo De Verona, Pleasanton, Calif.

Mrs. Hearst regrets that absence makes it impossible for her to give herself the pleasure of attending the American Mining Congress to be held in Deadwood and Lead during September, 1903.

August sixteenth.

Buffalo, N. Y., Sept. 1, 1903.

Hon. J. H. Richards, President American Mining Congress, Deadwood, S. D.

My Dear Mr. Richards:—On account of some important shipping matters in which I am interested here, I find it will be impossible for me to attend the Congress meeting at I expected and intended. I trust that the meeting will prove of great and lasting benefit to those who are deeply interested in practical mining and who will attend this session of the Congress. I have talked with a number of Eastern delegates who have promised me they will attend, some of them from the states of Ohio, New York and as far east as the Atlantic sea board cities. I bespeak for this session of the American Mining Congress a large, enthusiastic and practical meeting, and with kindest regards and well wishes to the delegates who so ably assisted in making the last year's meeting such a grand success and of which I had the honor to be president, I remain,

Sincerely and cordially yours,

Cleveland, Ohio

E. L. SHAFNER.



Elkins, West Virginia, July 13, 1903.

Irwin Mahon, Secretary, The American Mining Congress, Deadwood, S. Dakota.

Dear Sir: Your letter of invitation to the sixth annual session of the American Mining Congress, addressed to Hon. S. B. Elkins, is received. On behalf of Senator Elkins I wish to thank you for the courtesy and to assure of regret that an extended European tour will not permit of his enjoying the occasion.

Yours very truly,

F. L. DANISON, Secretary.

Wheeling, W. Va., July 13, 1903.

Mr. Irwin Mahon, Deadwood, S. D.

Dear Sir: I have your kind invitation to attend the American Miners' Congress convention, to be held at Deadwood, September 7th to 12th. Owing to previous engagements at our state fair which will be held about these dates it will be impossible for me to attend.

I should have been pleased to attend the convention, as I have been interested in mining for the past 45 years.

Hoping you will have a pleasant and successful meeting, I am,

Yours very truly,

W. B. SCOTT.

Cheyenne, Wyo, 7-13-03.

Irwin Mahon, Secretary, Deadwood, South Dakota.

My Dear Sir: I beg to thank you for your kind invitation to attend the sixth annual session of the American Mining Congress, to be held in Deadwood and Lead, South Dakota, between the 7th and 12th days of September.

I regret exceedingly that business and other engagements will serve to prevent my acceptance of your invitation.

Very truly yours,

F. E. WARREN.

Omaha, July 11, 1903.

Irwin Mahon, Esq., Secretary, Deadwood, South Dakota.

Dear Sir: I take pleasure in acknowledging receipt of your kind invitation to attend the American Mining Congress, the sixth annual session of which will be held in the cities of Deadwood and Lead between the 7th and 12th days of September, 1903.

It would afford me great pleasure to attend this session, but I find it impossible at this time to state definitely whether I shall be able to do so.

Thanking you for your courtesy, I remain,

Yours truly,

J. A. MILLARD.

Fort Dodge, Iowa, July 11, 1903.

Mr. Irwin Mahon, Secretary, American Mining Congress, Deadwood, S. D.

Dear Mr. Mahon: I have your letter inviting me to attend the annual meeting of your Congress during the early part of September, and in reply will say that my engagements are such for that time that

I will be unable to be with you, although I greatly appreciate the kindness of your invitation.

With cordial personal regards, I am,

Yours very truly,

J. P. DOLLIVER.

Dubuque, Iowa, July 14, 1903.

Mr. Irwin Mahon, Secretary, Deadwood, S. D.

My Dear Sir: I have your favor inviting me to be present at the sixth annual session of the American Mining Congress to be held at Deadwood, South Dakota, between the seventh and twelfth days of September.

I regret exceedingly that other engagements about that time will prevent me from having the pleasure to be present. I hope the results of the convention may be valuable to those interested in mining.

Very truly yours,

W. B. ALLISON.

Salt Lake City, Utah, July 15th, 1903.

Mr. Irwin Mahon, Secretary, The American Mining Congress, Deadwood, So. Dak.

My Dear Sir: I have the kind invitation of the American Mining Congress to attend its sixth annual session in September next. I should be very happy indeed to be present at the session of the Congress but it would be difficult for me to say positively at this time whether I could be present or not, but if I can arrange to attend I will notify you some time before the session convenes.

Trusting that the Congress will be a most profitable one and thanking you for your remembrance of me, I am,

Very truly yours,

THOMAS KEARNS.

Hartford, Conn., July 15, 1903.

Mr. Irwin Mahon, Secretary, The American Mining Congress, Deadwood, S. D.

Dear Sir: In the absence of Senator Hawley, on the water, where he is endeavoring to secure a pleasant and restful vacation, I beg to acknowledge your very kind invitation to him to attend the Mining Congress in September, and regret to advise that owing to previous engagements it will be impossible for him to attend. Yours truly,

R. W. THOMPSON,

Secretary Hon. J. R. Hawley.

Indianapolis, Indiana, July 15, 1903.

My Dear Mr. Mahon: Senator Beveridge directs me to thank you for your thoughtfulness in sending him an invitation to the American Mining Congress to be held in Deadwood, South Dakota, in September. The senator regrets that other engagements will make it impossible for him to attend, but he is appreciative of your invitation.

Very truly yours,

THOMAS R. SHIPP, Secretary.

Mr. Irwin Mahon, Deadwood, S. D.



Washington, D. C., July 15, 1903.

The American Mining Congress, Deadwood, South Dakota.

Gentlemen: I am in receipt of your very kind invitation to the sixth annual session of the American Mining Congress to be held in the cities of Lead and Deadwood, South Dakota, between the 7th and 12th days of September, and regret exceedingly that I will be unable to be with you during that time.

Yours very truly,

M. S. QUAY.

Hueneme, California, July 15, 1903.

Mr. Irwin Mahon, Secretary, The American Mining Congress,, Deadwood, South Dakota.

Sir: In the absence of Senator Bard, and in his behalf, I acknowledge the receipt of, and thank the American Mining Congress, for its cordial invitation to attend the sixth annual session of the Congress to be held in the cities of Deadwood and Lead, South Dakota, between the 7th and 12th days of September, 1903.

Senator Bard is not expected to return to the United States before October next.

Respectfully,

WM. M'HILLIKER, Stenographer.

Meadville, Penna., July 16, 1903.

Mr. Irwin Mahon, Secretary, The American Mining Congress, Deadwood, S. D.

Dear Sir: Your invitation on behalf of the American Mining Congress to attend the sixth annual session of the Congress, to be held in the cities of Deadwood and Lead, South Dakota, and addressed to Senator Penrose, is at hand, replying to which I beg to say the senator is absent in British Columbia, and will not return until after the event referred to. I, therefore, regret that the invitation cannot be brought to the senator's attention until after his return.

Yours truly,

W. R. ANDREWS, Private Secretary.

Tacoma, Washington, July 16, 1903.

Mr. Irwin Mahon, Secretary, The American Mining Congress, Deadwood, S. D.

Dear Sir: I desire to thank you very cordially for invitation of the American Mining Congress to be present at its sixth annual session, to be held in the cities of Deadwood and Lead, South Dakota, between September 7 and 12.

If it is at all possible I shall be only too glad to be with you; but at the present time the indications are that I will be prevented from doing so by previous engagements.

Wishing the Congress every success, I remain,

Yours very truly,

A. G. FOSTER.

San Francisco, July 18, 1903.

Irwin Mahon, Esq., Secy., The American Mining Congress, Deadwood, South Dakota.

My Dear Sir: I am in receipt of your kind invitation to be present at the sixth annual session, to be held in September, and wish to state that I accept with pleasure, and will surely attend.

With best wishes, believe me,

Yours very truly,

W. C. RALSTON.

Elizabeth, N. J., July 21st, 1903.

My Dear Sir: I regret extremely that I am unable to accept the kind invitation of the officers of the American Mining Congress to be present at the sixth annual session of the Congress to be held in the cities of Deadwood and Lead, South Dakota, between the 7th and 12th days of September, 1903.

Very truly yours,

JOHN KEAN, U. S. S.

To Mr. Irwin Mahon, Secretary, The American Mining Congress, Deadwood and Lead, So. Dakota.

June 26th, 1903.

Mr. Irwin Mahon, Sec., Deadwood, S. D.

My Dear Sir: I have your favor of the 24th and note your request for photographs. Very much do I regret that I have none and cannot readily secure photographs suitable for your purpose.

Truly yours,

A. B. KITTREDGE.

Wallace, Idaho, June 29, 1903.

Irwin Mahon, Esq., Deadwood, S. D.

Dear Sir: I have yours of June 24th requesting that I shall let you have half a dozen of my photographs, unmounted, for newspaper work. I have no unmounted photographs. However, I send you a copy of my latest and best photograph, and I suggest that you have a cut made of it for the several newspapers.

I hope that you are progressing nicely with your preparation. I am unable to say whether I will be with you this year or not. It will depend upon the courts.

Yours truly,

W. B. HEYBURN.

Cleveland, Ohio, August 1, 1903.

Mr. Irwin Mahon, Secretary, American Mining Congress, Deadwood, S. Dak.

My Dear Sir: I have just received your committee's invitation to attend the annual session of the American Mining Congress at Deadwood and Lead, South Dakota, September 7th to 12th. Please be assured of my appreciation of the courteous remembrance and my regret at not being able to accept the invitation. I shall be busily engaged, however, at that time in our state campaign and am compelled to decline all invitations, having placed my time at the disposal of our state committee.

With best wishes for a successful session, I am, truly yours,

M. A. HANNA.



Washington, D. C., August 5, 1903.

Mr. Irwin Mahon, Secy., The American Mining Congress, Deadwood,  
S. Dak.

My Dear Sir: I thank you for the kind invitation to attend the sixth annual session of the American Mining Congress, between the 7th and 12th days of September, and greatly regret my engagements are such it will be impossible for me to be present.

Very truly yours,

A. P. NORMAN.

Department of State, Washington, July 13, 1903.

Dear Sir: I have received the kind invitation of the American Mining Congress to attend the sixth annual session in September next, and very much regret that it will not be possible for me to avail myself of it.

With many thanks, I am,

Yours very truly,

JOHN HAY.

Irwin Mahon, Esquire, Secretary.

The attorney general regrets his inability to accept the invitation of the American Mining Congress to be present at the sixth annual session, September 7th—12th, Deadwood and Lead, South Dakota.

18 July. 1903.

The secretary of commerce and labor regrets his inability to accept the courteous invitation of the American Mining Congress to be present at its sixth annual session from September seventh to twelfth, 1903.

Department of Commerce and Labor, Washington, July 11, 1903.

Dear Sir: I beg to extend, through you, my thanks to the American Mining Congress for the invitation to attend the sixth annual session. It would afford me much pleasure to accept if the press of official business did not prevent.

Very truly yours,

JAMES RUDOLPH GARFIELD, Commissioner.

Mr. J. H. Richards, President, American Mining Congress, Deadwood, S. D.

Office of the Postmaster General, Washington, July 24, 1903.

Mr. J. H. Richards, President, The American Mining Congress, Deadwood, S. D.

Dear Sir: I am directed by the postmaster-general to acknowledge receipt of invitation, extended to him, to attend the sixth annual session of the American Mining Congress to be held in the cities of Deadwood and Lead, South Dakota, from the 7th to the 12th of September. 1903, inclusive.

The postmaster-general appreciates the courtesy of the invitation, but desires me to say that it will be impossible for him to be with you on that occasion.

Very truly yours,

F. H. WHITNEY,  
Private Secretary.

Department of the Interior, United States Geological Survey.

Washington, D. C., July 15, 1903.

Mr. Irwin Mahon, Secy., American Mining Congress, Deadwood, S. Dak.

Dear Sir: I have the honor to acknowledge the receipt of the invitation of the American Mining Congress to attend its sixth annual session between the 7th and 12th of September, 1903.

I very much regret that engagements previously made make it impracticable for me to be present at that time.

Very respectfully,

CHAS. D. WALCOTT, Director.

Honolulu, Aug. 17th, 1903.

Mr. Irwin Mahon, Secy. American Mining Congress, Deadwood, S. D.

Sir: Your kind invitation to attend the sixth annual session of the American Mining Congress to be held at Deadwood and Lead, South Dakota, from the seventh to the twelfth days of September, has been received, and I thank you very sincerely for it.

It would give me great pleasure to be present at your deliberations but it is impossible for me to be away from the territory for some time to come.

Hawaii is not a mining country as yet, though it has a considerable quantity of iron in the soil and evidences of other metals.

A friend of mine, Mr. Eben Parker Low, who has mining interests in Nevada, is going to leave in a few days for the mainland, and I have suggested to him that he visit the Congress as my representative. He has received the proposition with pleasure and will arrange his plans to be present. I take pleasure in introducing you to him. He was born and has grown up here and has made a conspicuous success in ranching. His mining interests are an inheritance from his father in addition to which he has taken out claims himself.

He will be able to furnish reliable information in regard to this territory, should your body be interested in hearing from him.

Very respectfully,

SANFORD B. DOLE, Governor.

Siamese Legation, Washington, D. C.

Mr. Edward Loftus presents his compliments to the president of the American Mining Congress and much regrets that he is unable to give himself the pleasure of accepting their kind invitation to attend the annual session of the Congress, in South Dakota, between the 7th and 12th days of September, 1903.

July 24th, 1903.

Russian Imperial Embassy, Washington.

Mr. Hansen begs to thank the American Mining Congress for their kind invitation to attend the sixth annual session of the Congress and regrets not to be able to accept, as it will be impossible for him to leave the city in the month of September.

July 21st, 1903.

THEODORE HANSEN.



Siamese Legation, Washington, D. C.

Phya Akharaz Varadhara, the Siamese minister, presents his compliments to the president and vice-presidents of the American Mining Congress and much regrets that his engagements render it impossible for him to accept their kind invitation to attend the sixth annual session of the Congress, between the 7th and 12th days of September next. July 24, 1903.

The Weirs, N. H., 25 July, 1903.

Sir: With reference to the invitations you sent for H. E. von Holleben, Count Amadt, Baron von Ritter, Consul Montgeles and Herr von Rebear, I am desired by H. E. the German ambassador, Baron von Sternberg, to let you know that all these gentlemen have left Washington for good and will therefore not be able to accept your kind invitation to attend the Mining Congress at Deadwood and Lead.

Yours very sincerely,

BARON V. I. BUNOKE,  
Councilor to the German Embassy.

Castle Hill, Newport.

Mr. Agassie regrets extremely that it is not in his power to accept the invitation of the American Mining Congress to attend the meeting to be held at Deawood in September.

July 15.

Chinese Legation, Washington, July 23, 1903.

The Chinese Minister, Sir Chentung Liang-Cheng, regrets that the pressure of official business prevents his acceptance of the invitation of the American Mining Congress to attend its sixth annual session to be held in the cities of Deadwood and Lead, South Dakota, between the 7th and 12th days of September, 1903.

Irwin Mahon, Esq., Secretary, American Mining Congresss, Deadwood, South Dakota.

Manchester, Mass., August the 1st, 1903.

Dear Sir: I beg to acknowledge receipt of your most kind invitation forwarded to me to assist at the American Mining Congress to be held this year at Deadwood, South Dakota, between the 7th and 12th of September.

In a few days I shall go to Europe for a leave of absence and so I am very sorry I shall not be able to attend your important Congress. I hope, however, you will accept, also on behalf of the other members of the executive committee, my best thanks, as well as the expressions of my high regards.

THE R. ITALIAN AMBASSADOR MAYOR.

Mr. J. H. Richards, President of the American Mining Congress, Deadwood, South Dakota.

Imperial German Embassy, Washington, D. C.

The imperial German embassy presents his compliments to the Secretary Irwin Mahon and begs to inform him that the following gentlemen: Herr von Holleben, Count Quadt Wykradt Isny, Frelheer Ritter zu Grauenstein, Count von Montgelas, Lieut.-Com. von Rebeur-Paschwitz, have left their post.

Washington, D. C., July 29, 1903.

Mr. Irwin Mahon, Secretary of the American Mining Congress, Deadwood, S. Dak.

Legation del Peru, Bay Port, Long Island, N. Y., July 25th, 1903.

Mr. Irwin Mahon, Secretary of the American Mining Congress, Deadwood, S. D.

Dear Sir: I beg to thank you and the representatives of the American Mining Congress for the honor extended to me in the invitation I have the pleasure to answer.

While my official duties at Washington will make it impossible for me to attend the meetings of the Congress, I am deeply interested in everything concerning mining, and I therefore take the liberty of asking you that all the proceedings, records and other literature that will be published thereafter be sent to this legation.

Thanking you in advance for your kindness,

Very truly yours,

MANUEL ALVAREZ CALDERON.

Legacion de Costa Rica, en Washington, July 21, 1903.

Mr. Irwin Mahon, Secretary of the American Mining Congress, Deadwood, South Dakota.

Sir: I have the honor to acknowledge the receipt of the kind invitation sent me to attend the sixth annual session of the Congress to be held in the cities of Deadwood and Lead, South Dakota, between the 7th and 12th days of September, 1903, and in answer thereto I am very sorry that notwithstanding my desire I would not be able to be present at the said session.

Thanking you very much and all the other members of the committee for your courtesy I remain, dear sir,

Yours very respectfully,

J. B. CALVO.

Belgium Legation, Newport, R. I., August the 6th, 1903.

Dear Sir: I thank you for the kind invitation which you have directed to me, in the name of the committee of the Mining Congress, which will meet in Deadwood and Lead, South Dakota, between the 7th and 12th days of September, 1903. I would feel very much honored and flattered to join that interesting meeting of so many prominent men of this country, but I am afraid that I will not be able to undertake such a long journey, and on that account, I do not think that I dare accept your kind invitation.

If I felt that I can avoid that difficulty it would, indeed, be a great pleasure for me to join and attend your most interesting and distinguished meeting.

In renewing you, and the members of the committee of the Mining Congress my best thanks for the kind invitation which has been bestowed upon me, I beg to remain with my highest consideration,

Yours very sincerely,

The Belgian Charge d'Affaires,

CHAS. C. WAUTERS.

Mr. Irwin Mahon, Secretary Mining Congress.



Chihuahua, Agosto 18 de 1903.

Senor J. H. Richards, President de American Mining Congress,  
Deadwood, South Dakota:

Muy Senor Mio: Doy a Ud. las mas expresivas gracias por la bondadosa invitacion que se servia dirigirme para que como Primer Magistrado de este Estado concurra a la sexta sesion anual del respetable Congreso que Ud. dignamente preside, y que tendia lugar en las Cidades de Deadwood y Lead, South Dakota, en los dias del 7 al 12 del proximo mes de Septiembre.

Recororco le grande importancia del objeco y fines propuestos per esa respetable corporacion, y quisiera corresponder a la atencion de Ud. asistiendo a dischas sesiones, mas como hace tan poco tiempo que me he hecho cargo del Gobierno de iste Estado, siento positivamente que los nogeois publicos de esta Entidad Federativa de la Republica Mexicana, me impadan separarme del questo que ocupo.

No pudiendo pues concurrir, por la raron antes expresada, de todos modos, quedo muy obligado por su finera y cortsia al invitarme, y deseandole el mejor exito a ese H. Congreso, le suplico que al aceptar para si mis agradecimientos, se sirva hacerlos presentes tambien a los demas miembros que to componen.

Aprovecho esta ocasion para suscribirme de Ud. afmo atento y S. S.

LIUS FERRAZAST.

Chicago, Sept. 1st, 1903.

Mr. Irwin Mahon, Sec., American Mining Congress, Deadwood, S. D.

Dear Mr. Mahon: The Spanish professor who usually does our translating is out of the city but the sense of the inclosed letter is as follows:

"Your invitation to attend the seventh annual session of the American Congress is received but on account of my duties as acting governor of this state I will be unable to attend this meeting. I appreciate the great value of such a convention and would like very much to represent this state. Express my kindest regards to all of your members and your honorable self.

Legation of Japan, Washington, September 3, 1903.

Sir: I beg to acknowledge the receipt of your cordial invitation to attend the sixth annual session of the American Mining Congress to be held shortly. While appreciating very highly your courtesy in this matter, I greatly regret that my official duties will not permit my absence from this city for availing myself of your invitation.

Very respectfully yours,

MUTSU.

P. S. Owing to my absence from Washington for the last two months I was unable to reply to your favor earlier.

President J. H. Richards, The American Mining Congress, Deadwood,  
South Dakota.

Melrose Cottage, Narragansett Pier, R. I., September 6, 1903.  
American Mining Congress, Deadwood and Lead, South Dakota.

Gentlemen: Thanking you heartily for the kind invitation you sent my predecessor, Baron Farsen, I regret to say it is quite impossible for me, his successor, to attend the sixth annual session of the Congress this year.

Hoping the session will be successful, I beg to remain,

Yours truly,

A. J. BOUNTAKOFF,  
Commander Russian Navy.

New York, July 13, 1903.

Irwin Mahon, Esq., Secretary, American Mining Congress. Deadwood, South Dakota.

Dear Sir: The invitation so kindly extended to Judge Henry M. Goldfogle has duly come to hand.

Inasmuch as Judge Goldfogle sailed for Europe on July 7th, I can only acknowledge the receipt of the invitation and say that the invitation will be brought to his attention at the first opportunity.

Very truly yours,

CHAS. J. OLEN, Secy.

Athens, Ohio, July 13, 1903.

Irwin Mahon, Esq., Sec., Deadwood, S. D.

My Dear Sir: I am very much obliged to you for your polite invitation, just received, to attend the sixth annual session of the Mining Congress.

I shall be absent from the United States, I think, at the time, and hence it will be impossible for me to attend, but none the less I feel a deep interest in the success and welfare of your organization.

With kind regards.

Yours truly,  
C. H. GROSVENOR.

Oakland, Cal., July 13th, 1903.

Dear Sir: I beg to acknowledge the receipt of your invitation to Mr. Metcalf to attend the meeting of your Congress. Mr. Metcalf is away from home upon his vacation at this time and will be gone for several weeks. On his return I shall call his attention to your polite invitation, which I am sure he will greatly appreciate, not being able to attend personally the sessions of your Congress, I am,

Yours sincerely,

FRED M. CAMPBELL, Secretary.

Mr. Irwin Mahon, Secretary, American Mining Congress, Deadwood, South Dakota.

San Francisco, Cal., July 13, 1903.

Irwin Mahon, Esq., Secretary American Mining Congress, Deadwood, South Dakota.

Dear Sir: I have the honor to acknowledge the receipt of your kind invitation to attend the sixth annual session of the American Mining Congress to be held in the cities of Deadwood and Lead, South



Dakota, between the 7th and 12th of September, 1903. Owing to a previous important engagement for those dates, it will be impossible for me to attend. This I regret very much, as I most cordially approve the aims of the Mining Congress and should take great pleasure in attending.

Thanking you for your kind invitation and regretting my inability to accept the same, I remain, Very sincerely yours,

WILLIAM J. WYNN, M. C.

Richmond, Virginia, July 14, 1903.

Honorable Irwin Mahon, Secretary, The American Mining Congress,  
Deadwood, South Dakota.

Dear Sir: I have the honor to acknowledge receipt of the very cordial invitation, extended by the officers of the American Mining Congress on its behalf to attend the sixth annual session of the Congress, September next. I deeply regret that my engagements are such that it will be impossible for me to be present on this occasion.

We are undoubtedly living in the metallic age, and the mining industries of our country have doubtless contributed more than any of the other resources of the country to the unprecedented development and prosperity of the nation. Such a Congress as is contemplated by the officers of your organization will inevitably be productive of great good to the material interests of the nation at large, and should receive the encouragement of all our people.

With assurances of my high consideration, and appreciation of your cordial invitation, I have the honor to be

Most sincerely yours,

JOHN LAMB, M. C.

Newark, July 14, 1903.

Irwin Mahon, Esq., Secy., The American Mining Congress, Deadwood,  
South Dakota.

Dear Sir: I beg to thank you and the members of the American Mining Congress for their kind invitation to attend their sixth annual session to be held in the cities of Deadwood and Lead, South Dakota, on September 7th to 12th inclusive, and regret very much that other engagements will prevent my acceptance.

With best regards and wishes for the success of your session, believe me, Yours sincerely,

R. WAYNE PARKER.

Norristown, Pa., July 14, 1903.

Hon. J. H. Richards, President, Irwin Mahon, Esq., Secretary, Deadwood, S. D.

Gentlemen: The courteous invitation of the American Mining Congress to its sixth annual session to be held in Deadwood and Lead, S. D., 7th-12th September, 1903, is at hand and I should be delighted to attend but it will probably not be possible for me to do so in consequence of the demands of public and private business.

With best wishes for the success of the session and of the enterprising cities in which it is to meet. Yours very respectfully,

IRVING P. WANGER.

Albuquerque, N. M., July 16, 1903.

Irwin Mahon, Esq., Secretary, American Mining Congress, Deadwood, South Dakota.

My Dear Sir: I am in receipt of your kind invitation to attend the American Mining Congress to be held in the cities of Deadwood and Lead, South Dakota, between the 7th and 12th of September, 1903, inclusive.

I return my sincere thanks for the same, and assure you I take great interest in the Congress, and it will be a pleasure for me to attend if I can, which is doubtful.

I am engaged in making the fight for the admission of New Mexico to the union, our bill having been talked to death last session of Congress, but we intend to renew it immediately. I will be under great obligation, Mr. Mahon, even if I don't attend the Congress, if you will cause a resolution to be introduced and passed in the Congress favoring the immediate admission to the union as states of New Mexico, Oklahoma and Arizona. The West is our friend in this matter, and the West should make its demands known. I will be thankful if you will take a note of the matter for action at the proper time.

With assurances of my highest regard, I have the honor to be,

Sincerely yours,

B. S. RODEY.

49 East 19th St., New York, July 16th, 1903.

Irwin Mahon, Sec'y American Mining Congress, Deadwood, S. D.

Dear Sir: I beg to acknowledge the receipt of your kind invitation to attend the American Mining Congress, to be held at Deadwood and Lead, South Dakota, between the 7th and 12th days of September, 1903.

Would say that your organization is one that I take much interest in, for the reason that I have been superintendent of a mine in former years, and am a member of the American Institute of Mining Engineers. But I regret that on account of business reasons, and serious illness in my family, I will not be able to attend the coming meeting, but I hope to meet with them at a future time. I appreciate your courtesy in sending me the invitation and remain, Yours truly,

WM. H. WILEY,

Member of Congress, 8th Dist., New Jersey.

Ashland, Pa., July 16th, 1903.

Mr. Irwin Mahon, Sec'y, American Mining Congress, Deadwood, S. D.

My Dear Sir: I am in receipt of your invitation to attend the annual meeting of the Mining Congress, and regret that it will be impossible for me to be present.

Yours truly,

GEO. R. PATTERSON, 12th Pa.

Bradford, Pa., July 16th, 1903.

Dear Sir: I regret that pressing business engagements will not permit me to accept your very kind invitation to attend the sixth annual session of the American Mining Congress.

Thanking you for the invitation, I am, Very truly yours,

S. R. DRESSER.

Irwin Mahon, Secretary, Deadwood, South Dakota.



Fall River, Mass., July 17, 1903.

Irwin Mahon, Esq., Secy., American Mining Congress, Deadwood, So. Dakota.

My Dear Sir: I thank you for the invitation to attend the sixth annual session of the Congress, but regret that business engagements at that time will prevent my acceptance.

Yours respectfully,

WM. C. GREENE.

Salt Lake City, Utah, July 21, 1903.

J. H. Richards, President, The American Mining Congress, Deadwood, South Dakota.

Dear Sir: I acknowledge herewith receipt of an artistic invitation to be present at the sixth annual session of the American Mining Congress, to be held between the 7th and 12th of September, in the cities of Deadwood and Lead, South Dakota. It will be quite impossible for me to attend, which I very much regret. But I shall certainly be there in spirit, for I appreciate the fact that such congresses do much for the industry of mining, to which the West owes so much of its prosperity.

Thanking you for the invitation, and with best wishes for a beneficial session, I remain,

Yours very truly,

JOSEPH HOWELL.

Milton, Pa., July 21st, 1903.

Mr. J. H. Richards, President, The American Mining Congress, Deadwood, S. D.

Dear Sir: I beg to thank you for your kind invitation to attend the American Mining Congress at Deadwood, S. D., between the 7th and 12th days of September, 1903, inclusive. I regret very much that imperative engagements will prevent my acceptance of your kind invitation.

Yours very truly,

C. H. DIEHLMAN.

Riverside, Cal., July 24th, 1903.

Hon. J. H. Richards, Pres., Deadwood, S. D.

Dear Sir: Replying to your kind invitation of recent date, beg to say that I regret that it will be impossible for me to be in Deadwood and Lead, South Dakota, to attend the session of the American Mining Congress in September next. Assuring you of my interest in the work of the Congress, I remain,

Yours very sincerely,

M. J. DANIELS.

Cleveland, Ohio, July 24th, 1903.

Mr. Irwin Mahon, Secretary of the American Mining Congress, Deadwood, South Dakota.

Dear Sir: In the absence of Mr. Burton in Europe, I am in receipt of your communication, requesting Mr. Burton's attendance with you upon the occasion of the sixth annual session of the Mining Congress in the cities of Deadwood and Lead, South Dakota, between the 7th and 12th days of September, 1903, inclusive.

Mr. Burton does not expect to return from Europe until October first, which makes it quite impossible for him to join with you on this occasion.

Very truly yours,

JAS. H. CASSIDY, Private Secretary.

Walden, New York, July 29, 1903.

Mr. Irwin Mahon, Secretary, American Mining Congress, Deadwood, S. Dakota.

Dear Sir: I have the honor to acknowledge receipt of an invitation extended by the American Mining Congress for dates between September 7th and 12th.

Prior engagements prevent my acceptance.

With thanks and regrets,

Very truly yours,

THOS. W. BRADLEY, M. C.

Telluride, Colo., July 30, 1903.

Irwin Mahon, Secy., Deadwood, S. D.

Dear Sir: I wish to thank you for your kind invitation to attend the American Mining Congress to be held at Deadwood in September. Unfortunately my affairs are in such shape that it will be impossible for me to attend. Thanking you for your kind courtesy and trusting that great good may come from the meetings of the Congress, and assuring you of my hearty accord with the objects of the meeting, I remain,

Yours sincerely,

H. M. HOGG.

Washington, D. C., Aug. 10, 1903.

My Dear Sir: Mr. McClellan is now traveling abroad, and will not return in time to accept the most courteous invitation of the American Mining Congress to attend its sixth annual convention to be held in the cities of Deadwood and Lead, South Dakota, between September 7th and 12th.

Yours very truly,

WADE M. SPELSHOUSE, Private Secretary.

Irwin Mahon, Esq., Secretary, Deadwood, S. Dakota.

MR. PATTERSON, OF NEBRASKA: Your committee on nominations would like to make their report at this time. We called the committee together last night at 8 o'clock in the Franklin Hotel, which consisted of the Honorable John T. Grayson, Colonel George, Mr. Rinehart, Judge O. E. Jackson, of Boise, Idaho, and your humble servant, Mr. Patterson. We had a very pleasant meeting. We took the matter up without any prejudices or biases, without anybody to punish or anyone to favor, with the sole object in view, that being the good of the American Mining Congress. There was not one member of the committee who desired office, no one hinted at such a thing, which is a little unusual; the sole object and thought of the meeting and the spirit of the meeting was how can we advance the interests of the American Mining Congress and make it one of the most interesting conventions that may be called together from year to year. We talked it all over pro and con. We talked over the past and present officers, those of us who knew them. I did not have the pleasure myself of knowing them all except at this meeting and it seemed to be the universal wish of the committee from their various reports that they had gathered from the other members of the Congress that our present president, Mr. Richards, should be named as a director (applause) and also that we should recommend and present his name to your honorable body for the next president of the Congress. (Applause).



There is only one name on the list of directors and officers that I have any objections to and I voted against him but the committee being the majority have overruled my vote and I was obliged of course to submit to their wishes or make a minority report, so I submit herewith the report of the committee which was unanimous with the exception of the one name, which you will probably recognize as you hear it read. The gentleman named was a member of the committee and he voted otherwise all the way through, so I beg, Mr. President and members of the Congress, to make the following report.

(The report was read).

With these names I submit the report, Mr. President, and the committee asks to be discharged.

PRESIDENT RICHARDS: Of course, any member will understand that this is simply a recommendation. You have a right to dispose of the report as any other report and change or substitute other names as the Congress may deem proper at the right time.

MR. MARTIN, OF SOUTH DAKOTA: Under the rules does this report have to be acted on at 2 o'clock?

PRESIDENT RICHARDS: My recollection of the by-laws is it comes up after lunch. The selection of place of meeting is at 2 o'clock and the election of officers immediately following.

MR. GEORGE, OF SOUTH DAKOTA: I would move, as the weather is bad and some delegates want to get away this afternoon, to suspend the rules and immediately proceed to act on the report of the committee on nominations.

The motion was seconded.

MR. RUSSELL, OF SOUTH DAKOTA: With all due deference to the motion, I will object to it on the ground that it may be taking a precedent for some future time and this is the first of our morning hours of this meeting and many delegates are not present who have a right to be present and this is one of the matters which is named in our by-laws to be disposed of at a special hour and at a special time, and for those reasons, not with any objection at all to the nominations or with any idea of delaying matters, I certainly hope that motion will not prevail.

MR. GRAYSON, OF OREGON: I would like to say I concur in Mr. Russell's idea. I believe that this matter should be postponed until after the place of holding the next meeting is selected. I believe the election of officers should be after the other matters are disposed of, anyhow.

MR. GEORGE, OF SOUTH DAKOTA: With the consent of my second I will withdraw the motion.

MR. MARTIN, OF SOUTH DAKOTA: The committee on resolutions have one other resolution which has been reported to it for consideration. The resolution is by Mr. Dignowity upon the subject of "Better protection of the Lives of Miners" and the committee has prepared a substitute embodying the same purpose which they report favorably.

The resolution was read.

MR. EDE, OF ILLINOIS: Mr. President, I have another resolution if it is in order.

MR. BUCKLEY, OF MISSOURI: I think it is rather unnecessary to present that in the form of a resolution. I think if it were in the form of a motion it would be sufficient, simply making a motion that the secretary be requested to have the proofs of the papers and ad-

dresses which have been presented before this Congress sent to the persons who gave those addresses and papers, before they are published in the proceedings, and have the proofs sent to the persons delivering the papers and addresses. Heretofore these proofs have not been sent to the individuals giving the papers and addresses and it has been customary in all publications to have this done.

MR. EDE, OF ILLINOIS: I will consent to put it in the form of a motion.

MR. BUCKLEY, OF MISSOURI: I will second the motion.

The motion as follows was stated by the president and duly carried:

That the secretary be and hereby is instructed to send proofs of papers and addresses to all persons presenting such papers and addresses before the same are published in the proceedings of this Congress.

MR. RUSSELL, OF SOUTH DAKOTA: I would move the adoption of the substitute resolution recommended by the committee on resolutions upon the subject of the better protection of the lives of miners.

COLONEL GRAYSON, OF OREGON: I second the motion.

The motion was stated by the president and carried.

At this time opportunity was given all persons interested to become members of the American Mining Congress.

MR. COLLINS, OF SOUTH DAKOTA: I have a resolution here that I would like to have read to the meeting.

The motion was read.

PRESIDENT RICHARDS: Do you wish it in the form of a motion or resolution?

MR. COLLINS, OF SOUTH DAKOTA: I will make it in the form of a motion.

The motion was seconded by Mr. Elder of South Dakota.

PRESIDENT RICHARDS: It has been moved and seconded that the directors of the American Mining Congress be instructed to prepare a button to be worn by the active members of this Congress and to turn it over to such members upon terms fixed by the board of directors.

The motion was carried.

MR. JACKSON, OF IDAHO: Mr. President, upon Tuesday last the chair, by order of the Congress, appointed a committee to draft a resolution of thanks to the president of the United States for sending his representative to this Congress. Owing to my illness yesterday I was unable to report but desire to do so now. I will read the report of the committee and also the resolution.

The report and resolution of the committee was read, which is as follows:

It was moved by Colonel George and seconded by Colonel Grayson that the Mining Congress adopt the resolution by rising vote, which motion was stated by the president and unanimously carried.

COLONEL GRAYSON, OF OREGON: As resolutions are in order I move you that we extend a vote of thanks to the Homestake Mining Company for the courtesy extended this Congress in allowing this Congress an opportunity to visit their great mine.

MR. O. P. TH. GRANTZ, OF SOUTH DAKOTA: I second the motion.



The motion was stated by the president and carried.

MR. PATTERSON, OF NEBRASKA: There have been some new members come in since we had a little social talk here a while ago. They might desire to be informed of what has been going on and I should not feel like slighting them. They might be offended and I would like, Mr. President, that you tell them what has been done.

PRESIDENT RICHARDS: The question that has been considered for a short time this morning is the question of membership. I think I know the mining men of the West. I have worked with them in the mines, I have chopped wood with them on the mountain tops—I have slept with them on the mountain side, simply lulled to sleep by the music of the pines and nothing to guide us but the silent stars in our slumber. I know those mining men. I have met them everywhere. When I meet mining men like Jack Gray or Colonel Ewing, my heart goes right out to them. I understand them because I have labored with them, lived with them, endured hardships with them, invested my money with them—that never came back. These are the types of the Western mining man and no just cause was ever appealed to them without a wholesome response. The question in my mind is how to get before that class of mining men the aims and purposes of this Congress that we might get their sympathy. With their sympathy I know what the future of this Congress would be and for a long time I have been studying the question of how to reach such men at Mr. Gray and Mr. Ewing and the many others like them. When we get their sympathy and support I know the future of this Congress is going to have a mighty influence in placing mining on the proper plane and making it take its place among the great industries of the country. If you can tell me in any way that I can reach that class of men then everything looks well for the future. I am willing to do all I can to reach that class of men because I know them—when we reach them I know we will get their support. I have been thinking of these mining men and as to how we can reach them and elevate the industry of mining, because I see that there is an opportunity for the West when I see the great financial interests that are reaching across the Pacific. This Western country is going to be the center, the pivot of the greatest industrial development ever seen during the next twenty-five years and out of it are going to come up in this Western country the Western mining men that will take a large part in directing that development. We desire to appeal to them to give us their support by becoming members of this Congress. The first thing we can do in a body of this kind is to make ourselves first respectable, then honorable, so that it will be a badge of honor to any man who becomes a member of the Congress. In watching the great contest that is going on between labor and capital it strikes me that I see one great weakness of the labor organizations. My heart is in sympathy with their efforts in every department but I would help them and not hinder them. One of the great weaknesses of the miners' federation is that it is ceasing to be an honor to be a member of that organization. When you see a Brotherhood of Locomotive Engineers you see one of the greatest labor organizations this world has ever seen. It is a badge of honor to be a member of that organization. When the mining federation see to it that it becomes an honor to become a member of that body then they will have power and truly represent the interests of labor and not until then in my judgment, and I state this merely as a suggestion to the mining organizations that they may look to it to have quality a question in their organizations rather than quantity and we must do the same. Therefore we want the mining men. If this Congress is ever going to succeed it will be because the miners make it a success and when they make it a success the capitalists will come in for admission at its doors and not until then. It is not capital that ever leads the way into great development; it is the individual. You have the great Homestake mine

here. It was not brought to the attention of the world by capital but by the miner that did the work in that great Homestake. It was his faith that gave the Homestake to the world and not capital. Capital came in after the miner had demonstrated the wealth of that great mine and it is true of this Congress, and it will be the miner who will demonstrate the worth of this Congress, and when it does capital will come to its doors for admission, for it will find it to its interests, and in that spirit we want the miners of this Western country to join this Congress, give us the support of membership, that we may have dignity added to it by such membership, and it is upon that plane that I would appeal to you.

I would like to have had time to have prepared a careful address on that line. This has simply come as a spontaneous thought of the moment but in it is the kernel of our success in my judgment, and when another year has come around I may be able at that time to more carefully suggest to the miners of the West some thoughts along this line. I believe we are going to reach those miners and every miner that is in sympathy with us should send his name to the secretary and ask to become a member of this Congress. I have never been treated so generously and so kindly in my life as I have by miners. I have been entertained in the palaces of the rich but I never knew what true hospitality was until I stepped across the threshold of the miner in his cabin. I found there nothing but mother earth for a carpet, nothing but boughs for his couch and nothing but hope to lift him above the struggles of every day, but there was true hospitality. I knew I was welcome to the best that he had on earth. Those are the men that we want and it is by meeting these men in these cabins in the West and having them become members that you are going to make this Congress a success. I am thoroughly convinced of that. I came here without any desire to express my conviction on the question of the place of meeting, but the more that I have heard the more I have thought in the inception or starting out of this Congress it must be cradled in the arms of the miner if you are going to make a success. That is my hope and that will be my ambition.

**MR. DRAKE, OF OREGON:** Nearly all of these gentlemen present have had some of the same experiences you have just expressed with regard to miners and I would move now that the gentlemen and ladies present stand up and give three cheers for the sentiments that our president has so well expressed and which concur with our ideas. Which was given.

**PRESIDENT RICHARDS:** If there is no further business matters at this hour we will recur to the postponed paper by Mr. C. L. Dignowity, of Boulder, Colorado.

**MR. C. L. DIGNOWITY:** Mr. President, Ladies and Gentlemen: As a preface to my paper I wish to make a few remarks. In the first place I wish to cheerfully co-operate and acquiesce in the sentiments expressed by our worthy president here this morning in regard to our Congress and its future. I have been engaged in mining for a good many years. My vocation has been that from Alaska to Central America and from the Atlantic to the Pacific in search of gold and silver mines and other mining properties for the last fifteen years in the interests of Eastern investors. In doing so it has given me an opportunity to visit all the mining properties of interest to the mining sections throughout that broad territory and I have listened here with a great deal of interest to the worthy and able papers by those eminent gentlemen that have preceded me here in their discourses and papers on the Black Hills, which have given me a great deal of knowledge in that line, and I have made it a rule to attend every mining Congress that I possibly could in order to gain information. I have attended five of these Congresses and have been a member and done all I could for it. In my paper here it is somewhat broad and covers a good deal of territory, not only the gold fields of North Carolina but



taking in all of the Eastern range as well as Western interests. While I have no personal interest whatever financially in the Eastern fields my labor and my interests as far as I am personally concerned have all been confined to California, Nevada, Utah and Colorado, where I have had large mining interests, but we can go back to our boyhood days and we will remember that there are several mountain ranges upon this continent, one of which is in the Eastern section of the United States. Throughout that mountain range exists mineral fields of all classes, more particularly on the eastern slope and there is where I will confine my subject.

## GOLD FIELDS OF THE EAST AND THEIR LOW GRADE ORES. WESTERN COMPARISONS AND ITS VARIOUS ABUSES

Mr. President and Members: Much valuable information has been presented to this Mining Congress regarding these Black Hills, their geological formation and richness of mineral deposits, by the able geologists and mining men preceding me. I am surprised at the lack of papers representing other sections of our great American mining districts. As we are gathered here to learn, and expound all we can for the general good and development of the mining interests, we must recognize all fields. These Black Hills cover but a small section of the vast mineral territory of our country. Therefore, I shall take for my subject those vast gold deposits of the Atlantic coast range that are waiting for intelligent mining to bring to the productive stage.

Many of the eminent geologists and minerologists will support me in my claim; that abundance of gold in its various forms, is known to exist along the eastern slope of the Atlantic coast, making its greatest deposits in North Carolina.

After twenty-five years of active mining life in all its branches, given to the West and Old Mexico, one feels as if he could pass judgment upon the large mineral zones of this continent as well as on some of the serious abuses connected with mining in America.

Of late years my attention and labors have been called to the Eastern and Southern gold fields, and I shall try to present their conditions as found.

The records of compiled mining testimony at Washington, D. C., covering Virginia, North and South Carolina and Georgia are accessible to any desiring information upon these subjects. The Southern states will gladly send compiled mineral data, free of charge, to anyone upon application; which reports will show as great if not greater, gold deposits, in the same area, along the middle Atlantic slope, as is found in the West, a fact not realized by the majority of the Western mining fraternity, and which is worthy of their investigation. Gold was discovered in Virginia in 1782 and in North Carolina in 1793. Prior to 1848 the gold production of this country all came from the East, principally from North Carolina; that state alone producing all our gold up to 1827. A nugget, history tells, was found in this state in 1792 that weighed seventeen pounds and many more since of smaller sizes.

That human nature has not changed since the rush for the gold fields of California in 1849, is quite evident, for today as then the distant fields seem the greener and more enchanting. Miners and mining talent flocked from the Eastern fields, westward. Investors and money followed. Some succeeded, others failed; and were unable to get work. History repeats itself. We know today how good fields are abandoned to follow a rumor, and begin the mad chase of the will-o'-the-wisp. So the South became a neglected field by the restless miner, and was soon absorbed by the planter. Slave labor and a virgin soil made cotton and other products yield such handsome profits to the planter that the gold treasury vaults were soon plowed over and quickly neglected. The South offered no inducement to the prospector.

We know the prospector and his shyness of ready cash. Unless GRUB STAKED by some prosperous investor, his vacation is a hard one. The Southern gold fields now passed into rich plantations, and it took too much money to acquire land, therefore the PROSPECTOR was doomed.

Quite different was it in the West. Uncle Sam, with his large and ever generous heart, offered his public domain to those seeking to civilize and develop it, and also gave most liberal inducements to the prospectors. Surveyors, geologists, and scientific men were put to work;—maps and other data were compiled at government expense, and all given to the gold seekers free of cost. Soon the West was ablaze with prosperity. Time rolled on until the sad civil war brought wreck and ruin to the South. Investments there ceased entirely, and has only begun again within the last few years.

Today money is flowing southward as never before and is building up every kind of industry. So it now behooves the mining man to follow the van, and bring forth the hidden gold from those vast mineral zones and reefs.

The Eastern formation of the Appalachian range of mountains exhibits one continual belt from Virginia to Alabama, or red, brown and yellow slate and schists. Argillaceous and micaceous in origin. With no mountains or great uplifts or distorted formation like those of the Black Hills, Rockies or Sierra Nevada Ranges.

This belt consists of low rolling hills quite soft, and decomposed above the water line. The Oxidized ores in this Southern country can be worked today under our advanced methods at good profits, with gold valued as low as \$3 a ton. If the same quantities of ores and values can be made to pay large profits at the great Homestake mine, that has yielded over \$80,000,000—Independent of its kindred institutions, why not, in those Eastern fields under more favorable conditions?

I have learned by personal investigation, and from the able papers and illustrations, presented at this Mining Congress by the various geologists and mining men that these Black Hills slates and schists and other rocks are identical with those of North Carolina and the Eastern Appalachian mountain range, and likewise the gold deposition therein.

The old mint records from the South shows that gold in abundance was produced under the most primitive methods, by the old Spanish drag mill (arrastra) hand rocker, (wooden troughs) Chilian mills (round rockrollers) and later by the stamp mills. No shaft mining could be profitably worked in those days that did not produce a gold value above \$15 per ton, and this ore had to be oxidized, or of a loose and free nature. Nothing but shallow workings were attempted.

Deep mining for the sulphurets of a much higher gold percentage per ton, could not be undertaken, owing to the refractory nature of the metals and lack of machinery for pumping and hoisting at that period.

Now, it is quite different. No mining is too deep or ores too refractory to be profitably managed under our up-to-date methods.

The mineralized zones or reefs within that vast slate and schist belt, consists principally of finely divided stringers and lenses of variegated quality, from 1-10 inch to three feet in thickness, following the cleavages as well as cross and criss-crossing the zones, which are found 20 to 500 feet in width and in places miles in length, all of which is decomposed and easily mined above water level.

The gold occurs largely in chlorides and finely disseminated flour which was undoubtedly deposited in its precious condition by ascending gases and mineralized fluids.

Taking these mineral zones as a whole, they will in most instances, average from \$3 to \$6 per ton in gold, and as this ore gives but little slimes, the precious metals can easily be recovered by



cyanide acids. This slate formation crops out from ten to fifty miles wide, uniformly, not having been distorted or displaced to any great degree. Their course bears northeasterly and southwesterly and dipping mostly westerly from 30 to 55 degrees.

There are evidences of much mining having been done in early days, along the eastern slope, but not to any great depth. Prof. E. Emmons tells of Telluriums and Telluride ores in Virginia and North Carolina as far back as 1837 that were mined on a small scale.

The miners confined their work mostly to the veins containing free gold, which they saved by their aforementioned rockers and drag mills.

The primitive mill methods are still found in numerous localities gone to decay and relegated to the past.

Placer mining seemed quite popular in by-gone days and much free gold is still obtained by the farmers after a hard rain or during the flood period. I saw a full quart of medium-sized nuggets purchased in one locality last May that were picked up by the farmers during the spring season.

The oxidized portion of these vast gold zones are from fifty to two hundred feet in depth or to water line. Below the water line forms the sulphurites and bluish quartz highly imbedded with fine grains and stringers of gold. The veins seem to concentrate with depth and improve in value. This condition should naturally improve as has been the case in these Black Hills and of late in certain sections of North Carolina where the ore bodies have been followed downwards for three and five hundred feet.

It is an established fact that sulphurates penetrate the rock from below, therefore it is conclusive that the heaviest gold values lie deep. And hence better results will be gained by depth.

"Recent geological researches tell us that the Southern slate and schists formation is no less than two thousand feet deep and within this mass of rock must exist precious metals which cannot be exhausted for ages and is one of the most important gold deposits upon this continent (California not excepted)."

Could one-half of the idle mills of the West be transported to the Southern field along that broad gold belt there would be a transformation in gold productions of such a vast magnitude that the most skeptical "Doubting Thomas" would stand amazed.

There are no custom mills or samplers to treat or purchase these Southern ores which greatly retard the mining industry for that country.

There is abundance of capital in the Eastern and Middle States, waiting and willing to go into active mining propositions. Show them an investment that will yield a moderate profit and reasonable duration and they are ready to buy.

Statistics show over \$20,000,000 paid in dividends by mining companies to investors since 1902.

These facts coupled with the spring shearing of weak and bogus lambs by the various stock centers, and the subsequent fall skinning of their pelts by the shrewd manipulators, has naturally placed the market in a better condition to receive the legitimate proposition that might be offered. This, with the return of moneyed men from their vacations, ought to open the money vaults and allow mining to prosper as it should deserve.

Nothing could be safer than the vast low grade ores of these Eastern or Southern states, especially in North Carolina, with its mineral area of over 20,000 square miles. Where the cyanide reduction method has already made its advent, and is today, producing the yellow metal with large profits to the investor.

We will take, for example, the Colossus mill, located near Waxhaw, N. C., at the mine formerly owned by Commodore Stockton, which mine, according to the mint records of North Carolina, produced up to the beginning of the civil war, about \$700,000 (Bulletin No. 10 of the North Carolina Geological Survey, as compiled by the United

States mint, shows no less than \$21,830,528 in gold and silver, bullion credited to North Carolina alone). This is certainly conclusive testimony that gold in abundance exists in that state.

The Colossus mill has a capacity of one hundred tons per day, and is constructed for straight cyaniding by percolation.

The gold solution is forced upwards through the bottom of steel tanks of fifty-ton capacity. 15-100 of 1 per cent of cyanide solution is used; and from seventy to seventy-two hours required for leaching these tailings before the gold solution is passed over the zinc shavings, for deposition. From 90 to 92 per cent of the gold values are recovered.

This mill was built to treat a large deposit of tailings, some 40,000 tons in extent which came from this property prior to the civil war.

These tailings receive a straight roasting in order to free the ore from vegetable matter, they average about \$6 per ton in gold and after treatment, leave but 40 cents of their precious values to the ton, in the residue.

The gold product or auro-cyanide, after two weeks' run showed close to \$30,000 per ton in gold.

The mill had been in commission about one month, when these results were attained, and it had not got down to its best work as is the case with all new plants. This property consists of 1700 acres of highly improved farm land, through which traverses northeast and southwest, a gold reef or zone for 5,000 feet, which averages about 400 feet wide, and 60 feet above the level plain.

This reef is of a gray and reddish micaceous schist which is quite decomposed and easy to mine and dips westerly about 55 degrees which when sampled by cross cuts from end to end gave a value of \$5 in gold and two ounces of silver per ton and is thoroughly adapted to the cyanide treatment. Mill tests there gave 88 per cent extraction under a 70 hour leach with a 15-100 per cent cyanide solution.

The Colossus Gold Mining and Milling Company, a Philadelphia concern, is now arranging to erect, at an early date, a 1,000-ton plant, to treat this vast gold reef, and will use the present 100-ton mill to work up the present tailing deposits.

During my various investigations of this Eastern field various similar propositions to that of the Colossus property presented themselves, principally in Virginia and North Carolina, any of which can be secured at reasonable price and upon favorable terms.

These Southern lands can be bought at ten to thirty dollars per acre. In most instances, titles are perfect, conveying in fee-simple, all minerals and everything they contain. The timber and agricultural values alone are worth the price, not taking into consideration the minerals.

Choice pine lumber, cut to dimensions, is delivered at \$7 to \$12 per 1,000 feet. Hard woods at \$1 to \$1.50 per cord. Coal, \$2 to \$3 per ton delivered.

The climate is delightful, seasons are open the year round, temperature ranges from 80 to 90 degrees in summer and 45 to 60 degrees in winter.

Commodities of every kind are raised there, making living very cheap. Being in the center of civilization, near the sea, and railroads, transportation is reasonable, making the markets convenient.

Water for milling and domestic uses is bountiful and pure, competent labor, white or black, is plentiful at \$1 to \$1.50 per day, of ten hours, (without board).

The laborers are farmers, with fixed homes, who do not drift from place to place.

When these facts become fully known to the interested public MANUFACTURING gold will become as much an industry in that section as it is in the Black Hills. I have no personal interests in those Southern fields; my investments are all in Colorado, Utah and



Nevada, but by special request I was called upon to give some attention at this Congress to the open advantages offered by those Southern gold fields, and so consented.

Mineral lands in the West are acquired by discovery and location, and a mineral claim consists of ten to twenty acres, according to its state law.

To acquire patents from our government, each claim costs about \$700 or from \$70 to \$100 per acre.

After all these expenses, one is not then sure of his title to the mineral therein, as the "Apex" or Extra Lateral Rights may rob him of the ore.

This vexed Apex question is the curse of our Western mining industry and "should have died in its birthing." As it was permitted to live, we should, without delay, wipe it from our mining code, for it has driven and will continue to drive millions of dollars from our Western fields, into Old Mexico, and other foreign countries where the dreaded nightmare does not exist.

It is authoritatively stated and recorded, that the population of America is not as large as the number of dollars tied up in law suits in the West, owing to the Apex law. This Apex farce, in conjunction with the entanglement of location claim lines, makes "countless thousands weep."

It is a well known fact that many hundreds of reduction mills have been erected in the West, and are standing idle today, for want of proper ores to feed them.

A large percentage of promoters and mechanical engineers are responsible for these "cemeteries of mills," whose headstones mark their sad mistakes and not the legitimate mining man's.

It is so much easier to get the tender-footed investor from the East separated from his cash, by the alluring promise of "dividends as soon as the mill, now being built, is running."

The prospective buyer seldom investigates the advisability of such a mill, the amount of ore available nor its adaptability to the proposed treatment. The unscrupulous "engineer" or expert encouraged by a large and liberal "rake off" from the manufacturer naturally advises building the mill the first thing.

The Gugganheims for the Smelter Trust, are far-seeing mining men; they, with others, show their wisdom in reaching out for all mines of great ore tonnage for their plants, otherwise their mills would soon close for want of materials.

Developed ores are far behind the present milling capacity, not counting the many mills in course of construction.

Much more money and energy will have to be spent in developing ores; otherwise, there will be a great shortage of all kinds and closed mills must follow.

It is the duty of this Mining Congress, now in session, to use its best influence and power to correct and check these abuses; this done, you will have accomplished wonders for the mining interests of America.

"Seing is believing." "Seek and you shall find."

The mining man and his co-investor should view those Southern lands before casting his lot and money into those far distant fields of Alaska and South America, from whose mountains of myths he derives an annual dividend of experiences and an occasional clean-up of confidences as his reward.

MR. GRAYSON, OF OREGON: I would move a vote of thanks to Dr. Holmes for his able address, by rising vote.

The motion was seconded, stated by the president and unanimously carried.

It was moved and seconded that this Congress express its appreciation of the paper by Mr. C. L. Dignowity by rising vote of thanks, which motion was unanimously carried.

It was moved and seconded that Mr. Patterson, of Nebraska, be extended a vote of thanks for his excellent address in behalf of membership, which motion was carried.

**MR. PATTERSON, OF NEBRASKA:** I will make a motion that the chair appoint a committee to attend the St. Louis Exposition on behalf of the American Mining Congress, with Colonel Thomas Ewing as chairman of the committee, and also would suggest the name of Honorable John T. Grayson, of Oregon, as a member of the committee, and that committee be composed of not less than fifteen members of the Congress.

**MR. GEORGE, OF SOUTH DAKOTA:** I second the motion.

The motion was stated by the president and carried.

**MR. J. A. HOLMES, OF NORTH CAROLINA:** I would like to ask whether it is impossible to move to suspend the rules and proceed at once with the part of the work of this Congress which is set for 2 o'clock.

**PRESIDENT RICHARDS:** I would make this suggestion; possibly we might do that if we would let the records show we met here at 2 o'clock and comply with the by-laws by voting at 2 o'clock, considering the matters now.

**MR. HOLMES:** I would move, Mr. President, that we now proceed to consider the place of meeting.

**MR. PATTERSON, OF NEBRASKA:** I second the motion.

**PRESIDENT RICHARDS:** It has been moved and seconded that this Congress consider the question of a place of meeting for the next session of this Congress, the final vote to be taken at 2 o'clock.

Which motion was carried.

**MR. PATTERSON, OF NEBRASKA:** It is with great pleasure that I have been requested by the committee to place before this Congress the name of the place that will be a pleasure I know for all of us to hear and I trust and believe it will be a double pleasure for all of us to attend the next meeting of the American Mining Congress. The city to which I will call your attention and which I will name is one that we all know about. It is one that is surrounded by beautiful scenery and has a beautiful river running through it and by it. It is a city that has railroads running to it from all directions as well as the ships of the sea. It is a place you can enjoy yourself. It is a place you can visit any season of the year and pluck a flower from the yards without permission, as I have been informed by our distinguished guest, Colonel Grayson. The name of the city, Mr. President, to which I would call your attention for the next meeting of this important body is Portland, Oregon, and I would move you, sir, that this Congress meet in Portland, Oregon at a time next season, 1904, that the directors of this organization will hereafter name, probably in the latter part of July or the first week in August, or perhaps some other time that may be thought more agreeable, and at a time when people can attend.

**MR. HOLMES, OF NORTH CAROLINA:** I second the motion. I desire to say it has been my pleasure to be in Portland several times and I certainly will look forward to the hope that I may be able to break away from the St. Louis Exposition or get somebody to take me away from it so that I myself might go to Portland. It is a most



beautiful place to go to. What we want to do is to go there and mingle with its generous people, see what they are doing, tell them what we are doing and ask them to join us in the great purposes we have in view.

MR. GRAYSON, OF OREGON: I thank the gentlemen very much for the honor to Portland. We will try to give them a royal time and entertainment. We are prepared to do it in 1904 but we would not be prepared in 1905 when the exposition is on. It would be like St. Louis; we would be smothered up, covered up, an unknown quantity, but as it is I will guarantee you one of the best times—I don't say the best because nobody could do any better than our friends here have done for us, but I thank you and hope that every member will try and be present. I will hope to meet you all and see you all in Portland in 1904.

MR. DRAKE, OF OREGON: I presume that there may be an impression among some of the members that there was a division of opinion, something serious among the delegates from Portland. I had hoped that the convention might be held in 1905, because at that time there is to be a centennial celebration which I referred to in a resolution yesterday, noting and marking one of the most important epochs of the American people. One of my ideas was that by holding the convention at that time we would promote and strengthen the mining industry by displaying our mineral resources and informing the people of the interests that this American Mining Congress has in the development of the mining industry and thereby increase the membership of the Congress and promote the business in which the Congress is engaged by gathering together at Portland for the first time a mineral display such as has never yet been prepared and to make that one of the features of the centennial celebration. This was the idea I had entertained and hoped would have been carried. I certainly shall not do or say anything against this Congress going to Portland, I only say that in my judgment I had believed that the people of Portland and all of the state of Oregon and of all the Northwest, the Pacific states, would prefer to have had a meeting of this Congress there in 1905 for that reason. But I am glad that you are inclined to come there in 1904 and I want to invoke the cooperation of all of the mining states of the great Northwest to join with us and to make this Mining Congress in 1904 a success. What we need is to arouse all interests of the people and mining men in the great Northwest, in all the country from Canada to Mexico, from the Atlantic to the Pacific, and to impress upon them the importance of the mining industry in which so many of us are engaged. In as much as the opinion seems to be that the Congress should be held in Portland in 1904 there can be no objection and we heartily wish you to come as well as the states of Idaho, Washington and all the Western mining states. We will all be pleased to have you come there in 1904. You will all meet a cordial welcome. There will be no locks on the doors, and therefore I second also the motion to have the convention held in Portland in 1904.

MR. JOHN T. JONES, OF CALIFORNIA: Hailing from the little modest city, Los Angeles, which at one time aspired to have the next meeting of the Congress held there, I desire to second the motion for the next meeting to be held at Portland, Oregon. I desire, on behalf of Los Angeles, to second the motion that the next meeting of this Congress be held in Portland. I desire to say further, Mr. President and gentlemen, that the latch string of Los Angeles always hangs outside the door. When the year of 1905 rolls around we will be more than pleased to show you what genuine hospitality is in Southern California. Los Angeles is the home of a great many miners. The fact is many of them when they have made money enough to retire come to Los Angeles to live. If you will come to Los Angeles we will show you how they do live.

MR. LYNCH, OF MONTANA: On behalf of the state of Montana I rise to second the motion that the city of Portland, Oregon, be our next meeting place.

MR. BROWN, OF COLORADO: We, the people of Colorado, are perched on the summit of the divide, and as we are greatly interested in mining we of course enjoy entertaining and are delighted at being entertained, and having a central geographical position in this great mining country and being on the summit so that we can slide down hill in any direction to any point that may be suggested for the meeting of the Congress, we feel it is satisfactory to us wherever the Congress will be called, and we heartily second the nomination of Portland.

MR. JENKINS, OF IDAHO: On behalf of Idaho I rise to second the nomination of Portland.

MR. RUSSELL, OF SOUTH DAKOTA: On behalf of the state of South Dakota, on behalf of the people of the Black Hills, the mining men of South Dakota and on behalf of the Black Hills Mining Men's Association, on behalf of those who have had the pleasure and the honor of entertaining this Congress at this time, believing that the welcome this Congress will receive in the city of Portland, while it cannot excel the welcome that has been in our hearts, will equal it, heartily and sincerely do I second the nominating of Portland as the place of meeting of the next session of this Congress.

MR. DIGNOWITY, OF PENNSYLVANIA: On behalf of Pennsylvania, the Keystone state, I pledge my hearty support as far as I am able to assist in the next Congress and its work to be held at Portland.

MR. GARBY, OF WASHINGTON: On behalf of the chamber of commerce at Spokane in the state of Washington, having myself at one time the idea that I might possibly have had the privilege of inviting you to come to our own state, but the time being short, we were unable to make the arrangements, and as our sister state was in the race, it affords me great pleasure to second the motion for this Congress to meet at Portland.

MR. BENNETT, OF MINNESOTA: On behalf of the state of Minnesota I second the nomination.

MR. GOODNER, OF WISCONSIN: There may be a time when our little city by the lake, Milwaukee, Wisconsin, will be glad to welcome this Congress, but in the meantime I assure you that Wisconsin will not be second to anybody when it comes to Portland next year.

The motion was stated by the President.

It was moved and seconded that the secretary be instructed to record the vote as given at 2 o'clock this day, which motion was carried.

PRESIDENT RICHARDS: It now recurs to the original motion as amended that the next session of this Congress be held at Portland, Oregon, in 1904 and that the secretary be instructed to record the vote as given at 2 o'clock.

Which motion was carried.

PRESIDENT RICHARDS: I am authorized to state on behalf of Portland that to assist this Congress in meeting its liabilities for the coming year, they will pay into the treasury of this Congress three thousand dollars.

PRESIDENT RICHARDS: The next business in order is the election of officers. A motion is not necessary, it being a special order of business by the by-laws. Are you ready for the question



as to adopting the report of the committee on nominations for the officers of this Congress for the ensuing year. All in favor of that motion say "aye."

The motion was carried and the report was adopted.

MR. PATTERSON, OF NEBRASKA: Since making the report this morning I regret to say that we have received the declination of Dr. E. R. Buckley as director, which we are sorry for, but he states that it is impossible for him to give the time that he would feel that he should to the Congress and sends in his regrets. I have consulted with the other members of the committee in reference to a name to be substituted in his place and we have agreed upon the name of Honorable John Dern, of Salt Lake City, Utah, who is president and general manager of the Consolidated Mercury Mines, and I move that he be nominated.

MR. DIGNOWITY, OF PENNSYLVANIA: I desire to second the nomination.

PRESIDENT RICHARDS: As Mr. Buckley has declined are you ready for the question as to substituting Mr. Dern for Mr. Buckley?

The motion was carried.

MR. PATTERSON, OF NEBRASKA: Mr. President, I made a motion to have fifteen appointed from this Congress to attend the St. Louis Exposition and it was carried. I also stated in that motion that Colonel Ewing be named as chairman and Mr. Grayson be named as one of the members. I forgot one little thing that I now wish to correct with your permission and with the permission of the Congress, and that is to suggest that the name of our president be also included in that number of fifteen and it has been suggested by Mr. Grantz that one member from each state as far as fifteen would go would be a good idea on that committee. I suggest that for your consideration.

MR. EWING, OF CALIFORNIA: I would say to the Congress as I am fortunate to be appointed on that committee, I very much prefer the president of this Congress be chairman of that committee.

MR. GEORGE, OF SOUTH DAKOTA: I second the motion.

PRESIDENT RICHARDS: Gentlemen, no man in this Western country has been treated so kindly and generously as I have been by the mining men during the past. I appreciate more than I can tell what you have done, not because you have placed me in this position but because I feel that back of it you think I have rendered some service. I feel at this time, and I am more than ever impressed with the truth of the statement, that it is more blessed to give than to receive.

You have given me your votes and I accepted this position. I recognize that that man is greatest always in any place whether his duty has been to carry the hod or presiding over the destiny of a nation, who renders the highest service in the position in which he is employed. Therefore I appreciate it because I feel that whatever service I may have rendered you have appreciated it and that he who serves best is always the greatest. Therefore he who would be great among you let him be your servant. It is upon that theory and that theory alone that I accept. There is no man in the West so prominent in mining, no man more fitted to preside over that committee than Mr. Ewing, no man better to take us to St. Louis as a body than Colonel Ewing.

President Richards at this time asked for a suggestion from the Congress as to the appointment of a member from each state on the committee to visit St. Louis.

MR. MARTIN, OF SOUTH DAKOTA: If you have not named anyone from the state of South Dakota, I desire to present a name as a member of that committee.

PRESIDENT RICHARDS: I have named Mr. Russell.

MR. RUSSELL, OF SOUTH DAKOTA: Allow me to withdraw my name from this committee. I have been highly honored by the Congress. There are many men in the Black Hills Mining Men's Association who have worked just as hard and faithfully as I have in this matter all the way through, and as I have been so largely honored I trust that you will name the gentleman Mr. Martin had in mind.

PRESIDENT RICHARDS: You deserve this honor if any man in this Congress does. I want to say this, that while I feel honored very much that honor is largely due to such men as Mr. Russell and our secretary and to the inspiration that has been given us by the mining men and I desire that you accept.

MR. MARTIN, OF SOUTH DAKOTA: He is the very man whom I had in mind and as an additional reason I would like to see him on the committee for the reason he is chairman of our state commission to the world's fair in St. Louis, and above all other citizens in South Dakota would therefore be in a position to facilitate the very things for which this committee is appointed.

MR. FARGO, OF SOUTH DAKOTA: I wish to very heartily endorse the appointment of Mr. Russell.

It was moved by Mr. Jenkins, of Idaho, and duly seconded that Mr. Bennett, of Minnesota, be made a member of that committee, which motion was carried.

It was moved seconded and carried that S. B. Kemper be appointed on the committee.

It was moved by Mr. John Gray that Mr. Buckley, of Missouri, be proposed as a member of that committee, which motion was seconded and carried.

Other suggestions of persons to become members of the committee were made and appointed by the president and the committee is as follows:

Ewing, Arizona; Grayson, Oregon; Russell, South Dakota; Kemper, Montana; Trask, California; Jenkins, Idaho; Dignowity, Pennsylvania; Bennett, Minnesota; Brown, Colorado; Bortell, Ohio; Buckley, Missouri; Garby, Washington; Webster, Nebraska; Dern, Utah; Malko, New Mexico.

Mr. Martin spoke as follows:

Mr. President, and Gentlemen of the American Mining Congress: The Black Hills Mining Men's Association are not willing that this Congress should come to its close without bearing testimony in some degree to the high appreciation that they feel, individually and collectively, as an association, for our honored president, Mr. Richards. During the past year, having a large responsibility in the preparation for these meetings, the Black Hills Mining Men's Association have come into very close contact with our president, and they have found in him a gentleman always, a man of the highest type of character, brave and courageous in his plans and equally ready in their execution. And so, casting about us to how in some manner express in a permanent way these feelings, they have this moment commissioned me with the pleasant task of giving them expression.

It is the purpose of the Black Hills Mining Men's Association to have prepared at once a badge like this delegate's badge except that it will be marked as the badge of the President, with his name; to manufacture this of Black Hills gold and to transmit it as speedily as we can to our president.



We realize, gentlemen of the Congress, that of all the product of the mining industry in all the generations of the world, the best products have been the mining men. Indeed, it seems to have been the task of the mining prospector throughout all history to be the forerunner of civilization. By some marvelous disposition of Providence the precious metals, gold and silver, essential to the money systems of the world, have not been confined to any one locality, but distributed throughout the world and generally in the most inaccessible and improbable places, and as a result the brave men of the world in all generations have been the men who have been attracted to the frontier and have been the first to place their feet upon untrodden places. They have been the first to scale the mountain peaks. In the history of our own United States the discovery of gold in California in 1849 was the magnet that drew the brave men of that period across the Sierras and the matchless Rockies to begin the days of civilization on the far away Pacific coast. As a result came the first and then the next and the next transcontinental railroad until we are today banded by five or six of these great iron highways, and much as we talk of the West and the East it is but a comparative term. All points between San Francisco and New York are East and all points between New York and San Francisco are West. In all of this march of progress the miner in his cabin upon the frontier, with his disposition at all times to law and order, has been the pioneer in establishing American institutions and in laying the foundation for the administration of American law. Indeed, they are the pathfinders who have hewn down the trees, and thrown up the highways over which the marching forces of civilization have passed in subsequent years to possess this wonderful land. And so we realize that the best product of the mining industry, not excepting its gold, silver and metals of utility, is the type of brave, courageous, hospitable manhood that has always been in the fore in making the way for the civilization of this country. (Applause).

And we of the Black Hills Mining Men's Association, an association recently organized, but now some five hundred strong, and to grow to a much larger membership we have no doubt—I now but express the sentiment which is one in common with every member of this Congress, when we recognize in our worthy president the best type of that manhood that has in these days gone to the frontier to build up and give character and success to this great empire of the West. (Applause). And so we present to you, Mr. Richards, today this advance token of what is to follow as a very inadequate, but I trust a permanent suggestion of the deep feelings of our hearts in tendering you this note of our sincere regard. (Applause).

Mr. Richards made response as follows:

Again I am impressed with the one thought, as I have been before in my experience, that there is nothing so certain in this material world as the unexpected. I scarcely comprehend why this should be done, but I recognize that thought that true worth is in being, not seeming; to do each day that goes by some little good, not dreaming of great things to do bye and bye. That has been my aim in my own state, in my own home, politically and otherwise. I have never sought distinction for myself. It has been bestowed upon me perhaps more in my own home than any other section where I have been. I recognize that whatever of best qualities a man may possess, their merit is expressed through the highest service to his fellow men. That has been my ambition and aim. Some places are good to live in; some to die in. That was most pertinently expressed—I think I intimated here at one of our executive committee meetings when men of the Black Hills gave that committee a reception. We had a little play in the opera house in Boise City and the hero of that play was about to die and he called his friends around his dying bedside. He said he had one last request to make and that was to take him back

to Nampa, a little place surrounded with sage brush, that he might die there. They said, "Why do you make such a request as that?" He said, "I would leave the spot with less regret than any other spot on earth." Now while Nampa may be a good place to die in the Black Hills is a good place to live in. (Applause). I shall, as I have before, leave these Hills with regret.

That is a beautiful token of a beautiful sentiment and I will simply say to the men of the Black Hills I will wear it with honor.

MR. JACKSON, OF IDAHO: In behalf of Idaho i would like to make a few remarks to the gentlemen of the Black Hills Mining Men's Association who have so highly honored Idaho in paying tribute as it has to one of our citizens. I have often heard that the mining men of the Black Hills were good prospectors. Now I know it, for they have prospected Idaho and found some of our ablest, brightest and brilliant manhood whom you have made president of this session. (Applause). If you would have such prospecting done in Idaho we might soon hope in some portions of the state at least to rival the Black Hills in its gold production, but I wish to say, gentlemen, that you have made no mistake in honoring Honorable John H. Richards as you have. We know him as you see him here. He never puts the best foot forward but one time and that is all the time. His domestic life is all that it should be. We have honored him there repeatedly. We have made him mayor of our city, we have made him judge of our district court and we have never, I say, made any mistake. I can only liken him to one who I believe, irrespective of politics, you are all pleased to honor and his memory reverend today; one who has gone where he is free from the trouble of private life or of statesmanship, Major William McKinley. (Applause).

It was moved and seconded that Congress be adjourned until 2 o'clock, September 12th, 1903, which motion was carried.

September 12th, 1903, 2 o'clock P. M.

PRESIDENT RICHARDS: Let Congress be in order. I would like to suggest that immediately upon adjournment the new board of directors hold a session at once for the selection of their officers.

Secretary Mahon at this time cast the unanimous vote of this Congress for the next session of the Congress to be held at Portland, Oregon, in 1904. The secretary also cast the unanimous vote of the Congress for the election of the officers of this Congress as recommended by the committee on nominations.

PRESIDENT RICHARDS: The chair has no further business on the table. If there is anything to be presented at this time the opportunity is given.

MR. GEORGE, OF SOUTH DAKOTA: We have been distributing bouquets around expressing our appreciation of the able manner in which our officers of this Congress have done their duty, but there is one officer of this Congress who in season and out of season has devoted his best time and talent to the Congress and under the direction of the president and board of directors has discharged every duty incumbent upon him and therefore as a mark of appreciation of this Congress I move that a rising vote of thanks be extended to our able and efficient secretary of this Congress, Irwin Mahon, of Pennsylvania.

MR. PATTERSON, OF NEBRASKA: I second the motion.

PRESIDENT RICHARDS: It has been moved and seconded that as a mark of appreciation of the services rendered by our secretary that we express it by rising vote of thanks. Before that question is put I want to say to you that I have labored with Mr. Mahon now for one year. I have never met a man more willing to sacrifice his



own personal convenience, his time, his energy, his hopes, as he has shown for this Congress. I have spent with him a year in studying the wants of this Congress, together with such men as Mr. Buckley and Mr. Russell, and we see now something of the fruits of it in the expressions that have been given here. I now feel more hopeful and sanguine than ever before as to the success of this Congress, all largely due to the energy and intelligent action of our secretary and I take pleasure in putting this motion.

The motion was again stated by the president and unanimously carried.

**SECRETARY MAHON:** Mr. President and gentlemen of the Congress, I thank you.

**MR. EWING, OF CALIFORNIA:** If there is no further business before the Congress I now move that we adjourn sine die.

The motion was seconded and carried.

The American Mining Congress adjourned sine die.

#### MEETING OF BOARD OF DIRECTORS OF AMERICAN MINING CONGRESS, DEADWOOD, S. D., SEPTEMBER 12, 1903.

Meeting called to order by President J. H. Richards.

Present at meeting: J. H. Richards, Thomas Ewing, R. C. Patterson, John Gray, J. A. Holmes and James H. Lynch.

It was moved by Mr. Ewing, seconded by Mr. Patterson that the present president, Hon. J. H. Richards, be elected as president of this association, which motion was unanimously carried.

It was moved by Mr. Patterson, seconded by Mr. Gray that Thomas Ewing be elected first vice president of the American Mining Congress, which motion was unanimously carried.

It was moved by Ewing, seconded by Mr. Lynch that Mr. Patterson be elected as second vice president of the American Mining Congress, which motion was unanimously carried.

It was moved by Mr. Patterson, seconded by Mr. Ewing that Mr. Grayson be elected third vice president of the American Mining Congress, which motion was unanimously carried.

It was moved by Mr. Ewing, seconded by Mr. Gray that Thomas K. Muir be elected treasurer of this organization for the ensuing year, which motion was unanimously carried.

It was moved by Mr. Patterson, seconded by Mr. Ewing that Mr. Mahon be elected secretary of this association for the ensuing year, which motion was unanimously carried.

It was moved by Mr. Ewing, seconded by Mr. Gray that the president be authorized to accept the bond that may be given by the secretary and treasurer without the presence of the balance of the board, which motion was carried unanimously.

It was moved by Mr. Holmes, seconded by Mr. Ewing that the secretary be instructed to receive bids for the printing of the proceedings of this Congress and then, with the approval of the president, let such bid to such person as he may deem best, which motion was carried unanimously.

It was moved by Mr. Ewing, seconded by Mr. Gray that the salary of the secretary be temporarily fixed at \$150 a month, until the next meeting of the board of directors, which motion was carried unanimously.

It was moved by Mr. Ewing, seconded by Mr. Patterson that this meeting be adjourned, which motion was carried unanimously.

#### OFFICERS AMERICAN MINING CONGRESS.

J. H. Richards, Boise, Idaho, president.

Thomas Ewing, of California, 1st vice president.

R. C. Patterson, of Nebraska, 2nd vice president.

John T. Grayson, of Oregon, 3rd vice president.

Irwin Mahon, of Carlisle, Pa., secretary.  
Thomas K. Muir, of Oregon, treasurer.  
E. F. Brown, Colorado.  
J. A. Holmes, St. Louis.  
John Gray, Terraville, S. D.  
James H. Lynch, Montana.  
John Dern, Utah.

## NOTES ON THE DEVELOPMENT OF BUTTE.

C. W. Goodale.

(This paper was overlooked by the printers in the publishing of the proceedings at Butte, Montana.)

The history of the development of Butte mines is an interesting chapter in the story of the Northwest. The first discoveries of placer gold in Montana were made in the early sixties,, and in 1863 gold was found in the Butte district. The period of greatest activity in placer mining here was in 1864 and 1865, and the town of Silver Bow was a lively place at that time. The town of Butte was located in the fall of 1864, and in 1867 the townsite was laid out, and Butte as a placer camp reached its climax. The production of placer gold decreased rapidly from this date, and in 1880 it had become almost insignificant. The low grade of the placer gold, which sold for only \$14 to \$18 per ounce, gave some indication of the origin of this gold. That is, the prospecting for silver may have been suggested by the belief that gold of this grade must have come from veins carrying considerable silver, although it should also be stated that the prominent outcrops of black manganese ore, which were very noticeable, induced the prospector to explore them below the surface for silver ore.

The first lode location was made in the winter of 1864 and 1865, when W. L. Farlin located a claim, calling it the Asteroid, having found gold in the outcrop. This claim was afterward re-located by him, and called the Travona, in June, 1866. Some of the ore was roasted and amalgamated, and an ounce of silver bullion produced; but nothing was done towards the development of this property until 1875, when Mr. Farlin erected a 10 stamp mill and furnace near the mine, and began to treat the ore by chloridizing—roasting and amalgamation. This mill did not turn out much bullion until 1876, when the Hon. W. A. Clark furnished the means to complete the Dexter mill, as it was called, and the first successful treatment of the base silver ores of the district was commenced.

In 1868 the Lexington mill was built for the treatment of ores by the free milling process. This mill was situated in a gulch near Wyoming street, between Broadway and Granite. It was purchased by the Lexington Mining Company when that corporation was formed in France, and a 50 stamp mill with roasting furnaces was built near the mine in 1881.

In the meantime, discoveries of other silver veins had been made, and in 1875 Menery and Parckard came to Butte from Salt Lake and located a claim called the Aquisition Spur. They took out some rich silver ore, which they sent to Walker Brothers in Salt Lake. When this lot was sampled the returns were so satisfactory that Walker Brothers sent Mr. Marcus Daly to this district to look into the mining prospects generally. He arrived here in 1876, took a bond on the Alice mine for \$5,000, and notified Walker Brothers. Robert Walker and Prof. John E. Clayton came to Butte, and, after looking over the property, selected the site of the present main shaft of the Alice mine as a suitable place for sinking, and work was started in the summer or fall of 1876. Prof. Clayton gave a name to the great lode on which the Alice, Magna Charta, Veldemere and Moulton claims are located. He called it the "Rainbow" lode, from the broadly, sweeping curve of the outcrop.



In 1877, the shaft having reached a depth of 200 feet, an old 20 stamp mill was brought up from Ophir Canon, Utah, and was erected on the Alice property. It was arranged for dry crushing (water in sufficient quantities for wet crushing not being available) and the treatment of the oxidized or free milling ores was begun in the fall of 1877. In 1878 and 1879 a White-Howell roaster was added, thus providing for the chloridizing roasting of the sulphide ores. The 60 stamp mill of the Alice Company was built in 1880, and was equipped with two White-Howell roasters and revolving dryer.

The Moulton mill was completed about the same time as the Alice, and was equipped with 40 stamps and White-Howell roasters.

In 1884 the Blue Bird mine was purchased by a London company, and a 90 stamp mill was built for the property in 1886.

The mill of the Silver Bow Mining & Milling Company was built in the early eighties for the treatment of ore from the La Plata and other mines owned by the company.

The climax of the production of silver ores in Butte was reached in the year 1887, when the Alice Company was running 80 stamps, the Moulton 40, the Lexington 50, the Blue Bird 90, and the Silver Bow 30, or a total of 290 stamps. The amount of ore worked in these mills was nearly 400 tons per day, and to this should be added shipments of silver ore to the smelters probably 100 tons per day.

All of this ore carried gold in considerable quantities, and the yield was probably about \$25 per ton in gold and silver.

The Anaconda Company was first organized as the Anaconda Silver Mining Company, for the outcrop of the vein, while showing some copper, seemed to give promise of being more productive in silver than in copper. In the year 1881 the Dexter mill was leased for a year by Mr. Daly, manager of the Anaconda Company, and shipments to that mill amounted to 8,000 tons of oxidized silver ore, containing about 30 ounces of silver per ton. It is interesting to note that this ore contained just enough copper to make it unnecessary to add bluestone, in the raw amalgamation of this ore the resulting bullion was very base—sometimes running only about 400 fine. The ore shipped to the Dexter mill came from where the Neversweat hoist now stands, which was the location of Mr. Daly's first opening of the great Anaconda lode. At a depth of 100 feet a drift running northeast, ran into copper glance a few inches wide, which was followed about 200 feet.

About this time Mr. George Hearst visited the district, and a place was selected for sinking a shaft for the deep exploration of the lode.

The present location of the main Anaconda shaft was determined upon as the most suitable place for this development. A cross cut was run from this shaft, when it had reached a depth of 300 feet. In this cross cut five feet of copper glance was discovered, and shipments to Swansea began. While the silver veins were being developed the surface showings of copper ore were receiving some attention, and an effort was made as early as 1867 to smelt some of the ore from the Parrot lode in a little furnace built near that property, but nothing of practical importance was accomplished.

Mr. Clark turned his attention to the copper veins of the district in 1872, and in 1873 and 1874 he began the development of the Original, Colusa, Mountain Chief and Gambetta claims. The ore produced was shipped 400 miles in wagons to Corinne, thence by rail to Swansea, and to buyers of copper ore in this country, among them the Boston & Colorado Smelting Company, of Black Hawk, Colorado. In 1878 Mr. Clark suggested to the management of that company the construction of a custom copper smelter in Butte, and Mr. Henry Williams

was sent here to examine and report on the outlook. He reported favorably, and in 1879 the Colorado & Montana Smelting Company was formed, the present site of the Colorado smelter was purchased, and a local market for copper, as well as the silver ore of the district, was established.

The importance of this market in the development of the district is shown from the fact that one shipment of 35 per cent copper ore, from the Green Mountain claim to Baltimore works in 1877, gave no profit to the shipper after mining, freight and reduction costs were paid, and yet the gross value of the ore was about \$130 per ton in copper, for the average price that year was 18½ cents per pound. In silver and gold the ore carried not less than \$50 per ton. The works charged a high price for treatment, owing to the presence of arsenic, which made the metal brittle.

Soon after this the Parrot, Montana Copper, Clark's Colusa and Bell companies began smelting operations. The matte product of all these smelters was shipped to Eastern markets for refining. In 1884 the Anaconda smelter added its output to the stream of copper, and the prosperity of Butte increased rapidly. The formation of the Butte Reduction, Boston & Montana, Butte & Boston, and Montana Ore Purchasing Companies a few years later, greatly increased the Butte production of copper.

Important events in the development of Butte were the completion of the Utah & Northern Railway, from Ogden to Butte, in December, 1881, the connection of this road with the Northern Pacific at Garrison September 8th, 1883; the coming of the Montana Central in 1888, and the completion in 1890 of the Northern Pacific direct outlet to the East, over to Homestake Pass to a connection with the main line at Logan.

The metallurgical treatment of Butte ores has been very progressive. In the case of the treatment of silver ore we had first a free milling plant, which would only treat ore by raw amalgamation; then followed the chloridizing roasting in the Dexter mill with the reverberatory furnace; following this the White-Howell furnaces in the Alice and Moulton, while at the Lexington and Blue Bird, Stetfeldt furnaces were adopted. These mechanical furnaces were a great improvement upon the old methods of roasting.

In the metallurgy of copper more important improvements have been made. For instance, in calcining, the first work done in the district was in the old furnaces of the reverberatory type, and the cost of treatment was not much less than \$2 per ton. The first mechanical furnace introduced in Butte was the old O'Hara calciner, which was erected by Mr. Clark at his Colusa works in Meaderville. Then came the Breuckner furnace, which brought the cost of calcining down to about \$1.25 per ton. Soon after this, improvements were made in the O'Hara by Messrs. Allen and Brown, and furnaces were built which treated 50 tons of ore per day at a cost of 50 cents per ton. Then came the Pearce turret furnace in 1892, with a cost of treatment about the same as in the O'Hara above mentioned. Following this were furnaces of other designs, notably the Keller, Wethey, and Wethey-Holthoff; and finally the McDougall, which has a capacity of 40 tons per day, and in which the cost of treatment has been brought down to about 35 cents. No fuel is used after the furnace is thoroughly heated up and feeding of the ore has begun. The Pearce multiple hearth furnace should be mentioned in this connection, a furnace of this type having been recently built at the works of the Colorado Company, where it is giving very satisfactory results.

In reverberatory smelting the capacity of furnaces has been greatly increased by enlargement and better applications of the heat, and furnaces are now running on Butte ores which treat more than 150 tons per day.



Blast furnaces have also been greatly improved and enlarged, and 400 tons of ore and flux per day are now run through many of the larger furnaces of the district.

Up to the year 1883 the product of the Butte copper smelters went out in the form of matte but in that year the Manhes patents for Bessemerizing were adopted at the Parrot smelter, and the converting of matte into black copper was commenced. The first converters built at those works had a capacity of only 3,000 pounds of matte per charge, while at the Great Falls works, which were built in 1890, converters were installed which handled an average charge of 10,000 pounds. These were regarded as very large, until the new works at Anaconda were built, where the converters have a capacity of 20,000 pounds per charge.

Early in the year 1891 electrolytic refining works were added to the Anaconda plant, and in February of that year the first refined copper from this state was shipped. This department was rapidly increased to a capacity of 9,000,000 pounds per month. For several years the electrolytic residues were refined at Anaconda, and the gold and the silver separated. The electrolytic works of the Boston & Montana Company at Great Falls, with a capacity of about 4,000,000 pounds per month, commenced shipping cathodes to the East in March, 1893, and a year later the refined copper was made into "wire bars."

In the following tables, which have been compiled from all available sources of information, it may be noted that no production of copper is given prior to 1879, although shipments of copper ore in considerable quantities were made before that year. It will be interesting to note the average price of the metal in earlier years.

The importance of Butte as a producer of silver and gold at the present time, although the silver mines are closed down owing to the low price of the metal, is shown in the fact that our copper contains about .0375 ounces of silver and \$.0025 in gold for each pound of copper produced, or, approximately,  $2\frac{1}{4}$  cents in the precious metals for each pound of copper. On this basis the Butte copper yielded in 1891, 8,550,000 ounces of silver, which, at 55 cents per ounce, amounted to \$4,702,500, and \$570,000 in gold, or a total of \$5,272,500.

We have no figures at hand to show how many tons of ore were mined in producing the 2,841,791,572 pounds of copper shown in the table, but it may be taken as a safe estimate that the average yield of copper has been about 100 pounds per ton of ore, and on this basis, over 28,000,000 tons of copper ore have been mined in the Butte district down to the close of 1901.

Production of gold and silver in the state of Montana from the year 1862 to 1900, inclusive

Year—	Gold.	Silver.	Total.
	Coin value \$1.2929 per oz.		
1862 to 1881, inc.....	\$200,000,000	\$11,000,000	\$211,000,000
1882.....	2,550,000	4,370,000	6,920,000
1883.....	1,800,000	6,000,000	2,400,000
1884.....	2,170,000	7,000,000	9,170,000
1885.....	3,400,000	11,500,000	14,900,000
1886.....	4,422,000	13,849,000	18,271,000
1887.....	5,978,536	17,817,548	23,796,084
1888.....	4,200,253	15,790,736	19,990,989
1889.....	3,500,000	19,393,939	22,893,939
1890.....	3,300,000	20,363,636	23,663,636
1891.....	2,890,000	20,139,394	23,029,394
1892.....	2,891,386	22,432,323	25,323,709
1893.....	3,576,000	21,858,780	25,434,780
1894.....	3,651,410	16,575,458	20,226,868
1895.....	4,327,040	22,886,992	27,214,032
1896.....	4,380,671	20,324,877	24,705,548

Year—	Gold. Coin value	Silver. \$1.2929 per oz.	Total.
1897.....	4,496,431	21,730,710	26,227,141
1898.....	5,247,913	19,159,482	24,407,395
1899.....	4,819,157	21,786,835	26,605,992
1900.....	4,736,225	18,482,211	23,218,436
	<u>\$272,337,022</u>	<u>\$332,461,921</u>	<u>\$599,398,943</u>
	257,144,343 ozs.		

## MONTANA COPPER PRODUCTION.

Year.	Lbs. fine Copper.	Lake Cu. Av. price.	Amount.
1870.....		20 5-8	
1871.....		22 5-8	
1872.....		23	
1873.....		29	
1874.....		23 1-4	
1875.....		22 1-2	
1876.....		21	
1877.....		18 5-8	
1878.....		16 1-2	
1879.....	9,452,800	17 1-8	\$ 1,618,655
1880.....	6,294,400	20 1-8	1,266,667
1881.....	14,631,680	18 1-8	2,652,050
1882.....	9,058,284	18 1-2	1,675,782
1883.....	24,664,346	15 7-8	3,915,464
1884.....	43,093,054	13 7-8	5,979,161
1885.....	67,797,864	11 1-8	7,542,512
1886.....	57,611,485	11	6,337,263
1887.....	78,700,000	11 1-4	8,853,750
1888.....	98,504,000	16 2-3	16,410,766
1889.....	104,589,000	13 3-4	14,380,987
1890.....	112,700,000	15 3-4	17,750,250
1891.....	112,383,420	17 7-8	20,088,536
1892.....	158,413,284	11 1-2	18,217,527
1893.....	159,875,499	10 3-4	17,186,616
1894.....	185,194,385	9.56	17,704,583
1895.....	197,190,659	10.76	21,217,149
1896.....	228,886,962	10.88	24,902,901
1897.....	236,826,597	11.29	26,737,722
1898.....	216,648,077	12.03	26,062,763
1899.....	245,245,908	17.61	43,187,804
1900.....	245,998,365	16.19	39,827,135
1901.....	228,031,503	16.53	37,693,607
	<u>2,841,791,572 lbs.</u>		<u>\$381,209,650</u>

1,420,895 1572.2000 tons.



# INDEX.

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	Page.
Title Page .....	1
Sessions of the Congress .....	2
Roster of Officers Seventh Annual Session .....	3
Roster of Officers Sixth Annual Session .....	4
Proceedings of Sixth Annual Session .....	5
Address of Welcome by Mayor E. McDonald, of Deadwood.....	7
"America's Mining Man," by Ella Purkiss Dignowity.....	9
Committee on Resolutions .....	15
Committee on Credentials .....	15
President's Annual Address .....	16
Address by Hon. Leslie M. Shaw .....	22
Address by Col. Ed. F. Brown .....	25
Secretary's Report .....	29
Address by Russell, of North Dakota .....	31
"Good Roads for Mines," by Dr. J. W. Abbott.....	32
"Ore Deposits of the Northern Black Hills," by Dr. J. D. Irving; read by Dr. E. R. Buckley .....	38
"South Dakota," by Dr. J. E. Todd .....	51
Address by John Blatchford .....	60
Address of Welcome, by Hon. E. F. Irvin .....	62
Response to Address of Welcome, by President Richards.....	63
"Pyritic Smelting," by Dr. F. R. Carpenter.....	71
Address, by Hon. E. W. Parker .....	75
"The Geology and Minerology of the Black Hills," by Cleophas C. O'Harra .....	87
"The Money Metals and Their Influence Upon Civilization," by Hon. John L. Webster .....	94
Report of Committee on Credentials .....	103
By-Laws of The American Mining Congress .....	121
Resolution Relative to the Collection of Mineral Statistics.....	126
Resolution as to Mineralized Timber Lands .....	128
Resolution Favoring Home Rule and Statehood for Arizona, Oklahoma and New Mexico .....	130

"A Solution of Our Interests in Money," by Chas. Albert Long...	132
"Aerial Tramway as An Economic Means of Transportation," by Dr. Stephen de Zombouy .....	149
"The Gold Ores of San Juan County" by A. H. Elftman, Ph. D....	152
"Mechanical Drying of Minerals," by C. O. Bartlett.....	154
Letter from Senator Morgan, of Alabama.....	159
Communications .....	169
"Gold Fields of the East and Their Low-Grade Ores," by C. L. Dignowity .....	190
Speech by Mr. Martin .....	200
Response by Mr. Richards .....	201
Meeting of Board of Directors .....	203
"Notes on the Development of Butte," by C. W. Goodale.....	204

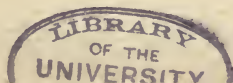




REPORT OF PROCEEDINGS  
OF THE  
SEVENTH ANNUAL SESSION  
OF THE  
**AMERICAN MINING  
CONGRESS**



Portland, Oregon  
August 22, 23, 24, 25, 26, 27, Inclusive  
-1904



# SESSIONS OF THE CONGRESS HAVE BEEN HELD AS FOLLOWS:

	DATE	CITY.	PRESIDENT.	ADDRESS	REMARKS.
1st	July, 1897.....	Denver, Colo.....	Hon. Alva Adams.....	Pueblo, Colo.....	Temporary.
1st	July, 1897.....	Denver, Colo.....	Hon. L. Bradford Prince..	Santa Fe, N. M.....	
2nd	July, 1898.....	Salt Lake, Utah.....	Hon. L. Bradford Prince...	Santa Fe, N. M.....	Passed to June, 1900.
3rd	July, 1899.....	Milwaukee, Wis.....	Col. B. F. Montgomery.....	Cripple Creek, Colo. }	
3rd	June, 1900.....	Milwaukee, Wis.....	Col. B. F. Montgomery.....	Cripple Creek, Colo. }	
4th	July, 1901.....	Boise, Idaho.....	Hon. L. Bradford Prince...	Santa Fe, N. M.....	
5th	Sept. 1902.....	Butte, Mont.....	E. L. Schafner.....	Cleveland, Ohio.....	
6th	Sept. 1903.....	Deadwood and Lead S. D...	Hon. J. H. Richards.....	Boise, Idaho.....	
7th	Aug., 1904.....	Portland, Ore.....	Hon. J. H. Richards.....	Boise, Idaho.....	



# CONTENTS

---

Title Page .....	1
Sessions of the Congress.....	2
Roster of Officers.....	5
Roster of Officers Seventh Annual Session .....	7
Articles of Incorporation.....	8
By-Laws .....	9

## PROCEEDINGS OF SEVENTH ANNUAL SESSION.

Address and Invocation. Rev. Father McDevitt.....	13
Address of Welcome, by Governor George E. Chamberlain, of Oregon...	14
Address of Welcome, by Mayor George H. Williams, of Portland.....	16
Response, by J. T. Small, of Maine.....	18
Response, by J. E. Talmage, of Utah.....	19
Response, by Zach Lamar Cobb, of Texas.....	20
Response, by J. T. Cornforth, of Alaska.....	21
Address and Presentation of Gavel, by B. B. Beekman, of Oregon.....	23
Response, by President Richards.....	24
Resolution Urging Creation of a Department of Mines and Mining.....	27
Resolution Urging Creation of Assay Office at Portland.....	28
Report of Committee on Permanent Headquarters.....	33
Resolution Urging Transfer to the Department of Agriculture the Care and Management of All Government Forest Reserves.....	35
Resolution Urging Appointment of Congressional Delegate for Alaska.	37
Resolution Urging Amendment of U. S. Laws Relating to Patenting Mining Claims .....	48
Report of the Committee on Credentials.....	50
Address on Permanent Headquarters, by President J. H. Richards.....	55
Resolution Urging Opening to Settlement of South Half of Colville Reservation .....	67
Secretary's Report .....	71
Report of Nominating Committee.....	71
Address Acknowledging Vote of Thanks, by President Richards.....	72
Address and Benediction.....	76

INDEX TO PAPERS AND ADDRESSES OF 1904 WILL BE FOUND  
ON PAGES 3 AND 4 OF PART II. OF THIS REPORT.









**President J. H. Richards,**  
Boise, Idaho.



OFFICIAL ROSTER  
OF THE  
OFFICERS AND COMMITTEES  
OF THE  
**AMERICAN MINING CONGRESS**  
1905

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OFFICERS

Hon. J. H. Richards, President.....Idaho  
Col. Thomas Ewing, 1st Vice-President.....California  
Dr. E. R. Buckley, 2nd Vice-President.....Missouri  
Mr. A. W. Gifford, 3rd Vice-President.....Texas  
Jas. F. Callbreath, Jr., Secretary.....Colorado

BOARD OF DIRECTORS

Hon. J. H. Richards, Idaho; Col. Thomas Ewing, California; Dr. E. R. Buckley, Missouri; Mr. A. W. Gifford, Texas; Mr. John Dern, Utah; Mr. J. Frank Watson, Oregon; Mr. Joseph T. Cornforth, Alaska; Mr. Geo. W. E. Dorsey, Nebraska; Mr. William Lennox, Colorado.

PROGRAM COMMITTEE.

Dr. E. R. Buckley, Rolla, Missouri; Seeley W. Mudd, Los Angeles, California; J. F. Callbreath, Jr., Denver, Colorado.

LEGISLATION COMMITTEE.

J. H. Richards, Boise, Idaho; J. M. Wright, San Francisco, California; J. Warner Mills, Denver, Colorado; O. W. Powers, Salt Lake City, Utah; P. W. Kimberly, Chicago, Illinois.

TRANSPORTATION COMMITTEE.

A. W. Gifford, El Paso, Texas; Col. A. G. Brownlee, Denver, Colorado; John C. Spry, Chicago, Illinois.

FINANCE COMMITTEE.

Col. Thomas Ewing, San Francisco, California; Jas. W. Malcolmson, El Paso, Texas; F. Wallace White, Cleveland, Ohio; Geo. W. E. Dorsey, Fremont, Nebraska; David H. Moffat, Denver, Colorado.

AUDITING COMMITTEE:

W. F. R. Mills, Denver, Colorado; Lyman White, Denver, Colorado; John Dern, Salt Lake City, Utah.

MEMBERSHIP COMMITTEE.

E. A. Colburn, Denver, Colorado; H. H. Nicholson, Lincoln, Nebraska; M. P. Kirk, El Paso, Texas.

EIGHTH ANNUAL SESSION

Meets at El Paso, Texas, Nov. 14 to 18, 1905.

PERMANENT HEADQUARTERS, DENVER, COLORADO.





OFFICIAL ROSTER  
OF THE  
OFFICERS AND COMMITTEES  
OF THE  
AMERICAN MINING CONGRESS

Seventh Annual Session

HELD AT

Portland, Oregon, August 22-27  
1904

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OFFICERS

Hon. J. H. Richards, President.....Boise, Idaho  
Col. Thos. Ewing, 1st Vice-President.....Los Angeles, California  
R. C. Patterson, 2nd Vice-President.....Omaha, Nebraska  
J. Frank Watson, 3rd Vice-President.....Portland, Oregon  
Merchants National Bank, Treasurer.....Portland, Oregon  
Irwin Mahon, Secretary.....Carlisle, Pennsylvania

BOARD OF DIRECTORS.

Hon. J. H. Richards, Idaho; Col. Thomas Ewing, California; R. C. Patterson, Nebraska; J. Frank Watson, Oregon; Col. E. F. Brown, Colorado; Dr. J. A. Holmes, North Carolina; John Gray, South Dakota; Hon. James H. Lynch, Montana; John Dern, Utah.

LEGISLATIVE COMMITTEE.

Hon. J. H. Mitchell, United States Senator, Chairman, Oregon; Hon. J. H. Richards, Idaho; Col. Thomas Ewing, California.

PROGRAM COMMITTEE.

R. C. Patterson, A. M., Chairman, Nebraska; J. Frank Watson, Oregon; John Gray, South Dakota.

TRANSPORTATION COMMITTEE.

Irwin Mahon, Chairman, Pennsylvania; Hon. J. H. Lynch, Montana; Capt. Thos. K. Muir, Oregon.

BUILDING COMMITTEE.

Col. Thos. Ewing, Chairman, California; David H. Moffat, Denver, Colorado; J. R. Leonard, Pittsburg, Pennsylvania.

# ARTICLES OF INCORPORATION

## OF

### THE AMERICAN MINING CONGRESS

Know all men by these presents, That we, the undersigned, citizens of the United States, have this day voluntarily associated ourselves for the purpose of forming a private corporation, not for profit, under and by virtue of the laws of the State of Colorado, and we do hereby set forth and declare, as follows:

#### First.

That the name of this corporation is and shall be **The American Mining Congress.**

#### Second.

That the objects for which this corporation is formed are:—

For the purpose of advancing the Mining and Metallurgical Industries, in all their various branches, within the United States.

To assist in bringing about a more perfect co-operation between the government of the United States and the development of mining and metallurgy; to encourage education in practical and scientific mining and metallurgy, and the dissemination of scientific information in relation to mining, metallurgy and their allied industries; to acquire and disseminate trustworthy information bearing upon the development of the metallic and non-metallic mining resources of the United States; to promote a more co-operative tendency in the evolution of agriculture, mining, manufacturing, transportation and commerce, and for the particular purpose of bringing the mining men of the United States into closer relations with one another, and of promoting a friendly feeling for one another through social intercourse and the discussion of mutual interests.

To acquire, hold and own such real and personal property as may be necessary to properly carry into effect the purposes hereinbefore set forth, and to perform all such other acts and things as may be necessary to the full carrying into effect the said purposes.

#### Third.

That the corporate powers of this corporation shall be vested in a board of nine directors, and the names and residences of those who are appointed as directors for the first year of the life of this corporation and until their successors are elected and qualified, are as follows:

Name.	Residence.
J. H. Richards.....	Boise, Idaho
S. W. Russell.....	Deadwood, S. D.
E. R. Buckley.....	Rolla, Mo.
Thomas Ewing.....	Los Angeles, Cal.
Irwin Mahon.....	Carlisle, Pa.
Charles W. Goodale.....	Butte, Mont.
John T. Grayson.....	Portland, Ore.
W. L. Kendall.....	Cleveland, O.
L. K. Armstrong.....	Spokane, Wash.

In Witness Whereof we have hereunto set our hands and seals this 25th day of February, 1903.

J. H. RICHARDS.  
S. W. RUSSELL.  
E. R. BUCKLEY.  
THOMAS EWING.  
IRWIN MAHON.  
CHARLES W. GOODALE.  
JOHN T. GRAYSON.  
W. L. KENDALL.  
L. K. ARMSTRONG.



# BY-LAWS

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## ARTICLE I.

### NAME.

This organization shall be known as "The American Mining Congress."

## ARTICLE II.

### OBJECTS.

This corporation is formed for the purpose of advancing the mining and metallurgical industries, in all their various branches, within the United States.

To assist in bringing about a more perfect co-operation between the government of the United States and the development of mining and metallurgy; to encourage education in practical and scientific mining and metallurgy and the dissemination of scientific information in relation to mining, metallurgy and their allied industries; to acquire and disseminate trustworthy information bearing upon the development of the metallic and non-metallic mining resources of the United States; to promote a more co-operative tendency in the evolution of agriculture, mining, manufacturing, transportation and commerce; and for the particular purpose of bringing the mining men of the United States into closer relation with one another, and of promoting a friendly feeling for one another through social intercourse and the discussion of mutual interests.

## ARTICLE III.

### MEMBERSHIP.

Section 1. Any person actively associated with mining, who, after his application has been approved by the committee on membership, shall pay an initiation fee of five dollars (\$5.00), shall become an active member of this Congress and thereafter he shall pay in advance an annual fee of two dollars (\$2.00) and shall vote and enjoy all other rights and privileges usual to members.

Sec. 2. Any person entitled to active membership in this Congress may, upon the payment of fifty dollars (\$50.00), become a life member, and shall, without the payment of further annual dues, be entitled to all the rights and privileges of active membership.

Sec. 3. Any person actively associated with mining, with the approval of the committee on membership, shall, upon the payment of a fee of one dollar (\$1.00) per annum, become an associate member of this Congress, and shall be entitled to attend the sessions and participate in the deliberations of the Congress, but shall not be entitled to vote or hold office.

Sec. 4. Honorary membership may be conferred upon such persons as this Congress shall deem worthy of such distinction. Honorary members may be elected at any regular meeting of the Congress upon the recommendation of the committee on membership and the approval of the board of directors.

Sec. 5. No person who shall comply with the requirements of this article shall be denied membership to this Congress

## OFFICIAL PROCEEDINGS

## ARTICLE IV.

## DELEGATES.

A chief executive of any country, state or territory may appoint as delegates to any annual session of this Congress, ten (10) persons actively associated with mining; and the mayors of cities or towns, boards of trade, boards of county commissioners, scientific associations, miners' organizations, mining bureaus, chambers of commerce, and such other business organizations as may from time to time be designated by the executive committee, may each appoint two (2) such delegates, and each delegate attending, properly accredited, shall be entitled to participate in the deliberations of the Congress.

## ARTICLE V.

## DUES.

Life members shall pay a fee of fifty dollars (\$50.00); members, an initiation fee of five dollars (\$5.00) and annual dues of two dollars (\$2.00); associate members, annual dues of one dollar (\$1.00); and delegates nothing.

## ARTICLE VI.

## OFFICERS.

Section 1. The government and management of the Congress shall be committed, first, to a board of directors of nine members, to be elected annually by the Congress; second, to a president and three vice-presidents, to be elected by the board of directors from its members; and, third, to a secretary and treasurer, to be chosen by the board of directors.

Sec. 2. It shall be the duty of the board of directors to annually elect as president, vice-presidents, secretary, and treasurer, such persons as may be recommended by the Congress.

Sec. 3. For the purpose of facilitating the selection of officers, there shall be annually elected by the Congress at its second day's session, a committee of five members to be known as a nominating committee, whose duty it shall be to present to the Congress for its consideration the names of such persons as such committee may deem advisable to act as directors and officers of the Congress for the ensuing year.

## ARTICLE VII.

## DUTIES OF OFFICERS.

Section 1. The board of directors shall have power to do every act and thing which the business interests of the Congress may require except to amend or repeal these by-laws, but nothing in these by-laws shall give the board of directors the right to do any act or thing that is contrary to any motion or resolution adopted at any previous meeting of the Congress or that is contrary to any of the provisions of the charter of this Congress or of the by-laws. No person shall be eligible to be a member of the board of directors or to hold any other office in this Congress, except an active member of this association in good standing.

Sec. 2. A vacancy occurring in an office or in the board of directors shall be filled by the remaining members of the board, and the officer or member of the board so elected shall hold office until the next annual meeting or until his successor is elected.

Sec. 3. The president shall preside at all meetings of the Congress and of the board of directors and shall enforce all the laws and the regulations of the Congress. At the annual meeting of the Congress he shall report for the board of directors upon its proceedings during the year and recommend such measures as the board may deem advisable.



Sec. 4. In the absence of the president, the first vice-president shall perform his duties; in the absence of both president and first vice-president, the second vice-president shall perform the duties of the office; in the absence of the president and first and second vice-presidents, the third vice-president shall preside and perform the duties of the office; and in the absence of the president and vice-presidents, the board of directors may select a chairman from its members.

Sec. 5. The secretary shall conduct all of the official correspondence of the Congress. He shall keep a record of all meetings and proceedings of the Congress and the board of directors; shall collect all moneys due to the Congress, receipt for and transmit the same to the treasurer; and shall perform such other duties as may be assigned to him by these by-laws, by the Congress or by the board. At the annual meeting he shall report in detail upon the membership and condition of the Congress.

Sec. 6. The treasurer shall receive all moneys from the secretary, pay all bills as directed by the president and countersigned by the secretary and keep proper vouchers for all payments. He shall, at each meeting of the board of directors, present a statement of the financial condition of the Congress and shall at the annual meeting submit a detailed report, approved by the finance committee; and the said statement and reports shall, at all times after their presentation or submission, be open to the inspection of any of the members of the Congress.

## ARTICLE VIII.

### COMMITTEES.

Section 1. The following additional committees shall be elected by the board of directors:

An advisory committee, to be composed of one member from each state.

A committee on legislation, of five members.

A committee on membership of seven members.

A committee on transportation, of five members.

A committee on auditing and finance, of five members.

A committee on program of five members, to which committee each paper to be presented before any meeting of the Congress shall be submitted for approval in advance of said meeting, except such papers as may be presented on invitation of the program committee.

Sec. 2. The president shall appoint annually, a committee on credentials of three members, and a committee on resolutions of twenty members. The names of the members comprising these committees shall be in the hands of the secretary at the opening of each session of Congress.

## ARTICLE IX.

### BONDS OF OFFICERS.

Section 1. The treasurer of this Congress shall give bond for an amount to be determined by the executive committee, of not less than five thousand dollars (\$5,000); said bond to be approved by the executive committee.

Sec. 2. The secretary shall give such bond as may be required by the board of directors, not less than one thousand dollars (\$1,000).

Sec. 3. Bond fees of the treasurer and secretary shall be paid by the Congress.

## ARTICLE X.

### PUBLICATIONS.

Section 1. There shall be published annually a report of the proceedings of this Congress, including such papers, presented at the annual session, as may be approved by the program committee, and a list of the names, occupation and address of all members and delegates.

## OFFICIAL PROCEEDINGS

Sec. 2. The board of directors shall have the proceedings of each session copyrighted.

Sec. 3. All members and delegates shall be entitled to a copy of the proceedings of each annual session covered by their dues.

## ARTICLE XI.

## RESOLUTIONS.

All resolutions shall be submitted to the secretary in writing, read by him before the Congress and referred to the committee on resolutions for consideration and recommendations.

## ARTICLE XII.

## TIME AND PLACE OF HOLDING ANNUAL SESSION.

Section 1. The time and place of holding the annual session shall be determined by the board of directors.

## ARTICLE XIII.

## ORDER OF PROCEEDINGS.

Section 1. The sessions of this Congress shall be governed by Roberts' Rules of Order.

Section 2. The first day's session of this Congress shall be under the auspices and control of the local committee. The order of business for the remaining sessions shall be as follows:

1. Report of committee on credentials.
2. Unfinished business.
3. New business.
4. Reading of resolutions.
5. Reports of committees.
6. Addresses and papers.
7. Adjournment.

Section 3. The election of the board of directors and the adoption of a resolution addressed to the board of directors naming those to be elected by the board as officers of the Congress for the ensuing year, shall be a **special order** for two o'clock on the afternoon of the last day.

## ARTICLE XIV.

## AMENDMENTS.

These by-laws may be amended by a two-thirds vote of the members present upon twenty-four hours' notice in writing containing the amendment proposed.

# REPORT OF PROCEEDINGS

of the

## Seventh Annual Session of the American Mining Congress

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Held at Portland, Oregon, August 22, 23, 24, 25, 26 and 27, 1904.

The Congress convened at the Armory, Portland, Oregon, August 22, 1904, at 10 o'clock a. m., with President J. H. Richards in the chair.

**PRESIDENT RICHARDS:** Reverend Father McDevitt will invoke the divine blessing upon our proceedings.

**REVEREND FATHER McDEVITT:** Mr. President and members of the American Mining Congress:

To his Excellency Governor George E. Chamberlain has been committed the pleasant task of welcoming you to the great State of Oregon. To his Honor, George H. Williams, mayor of this city, has been committed the pleasant task of bidding you welcome to the beautiful city of Portland. To your humble servant has been committed the sacred, solemn, pleasing task of bidding you welcome in the name of the living God. I realize, friends and fellow citizens, that I am in the presence of splendid human intelligence. I believe there are grand, noble and generous hearts throbbing here this morning. I do not forget that we are all children of a great eternal God, and that without His divine blessing, no matter how wise we may seem to ourselves to be, our work in the end will be futile if His blessing descends not upon us.

Allow me just these few moments, these few preliminary remarks. I hold in my hand here what many choose to term the almighty dollar. Man has stamped it, but man has not made the metal of which it is composed. Bright though you may be, grand, noble American citizens, no one of you has the wisdom nor the power to bring into existence the metal of which that little dollar is composed.

Now, my dear friends, from the depths of a heart that is throbbing within, I implore from our Heavenly Father his blessing upon you this morning. Long ago he told us, "Unless the Lord build the house he labors in vain that builds it." So it will be with your Mining Congress. If He blesses you not, then in vain, I repeat, will be your labor, no matter how wise it may seem to you to be. Mighty is the power of prayer, my dear friends. You have not given unto yourselves the grand intelligence that presides in your brains. You did not place that human heart within your bosoms. Without His divine aid you cannot think aright and you cannot feel right.

I welcome you then in the name of the living God as I trust you are true patriots, that you have not come here with any selfish motives, but for a grand and a glorious purpose; that the influence of this Congress may be spread far and wide, not only for your own benefit, but for the benefit of the poor men who are this morning laboring in the darkness of the mines. May the great eternal God who has given wealth to the world, who has made the universe and who rules it, may He bless you this morning. I ask you most respectfully to re-collect yourselves whilst I turn to that great Heavenly Father with all the energy of my immortal soul and say that grand old prayer that you learned in your childhood: Our Father who art in heaven, hallowed be Thy name, Thy kingdom come, Thy will be done on earth as it is in heaven. Give us this day our daily bread, and forgive us our trespasses as we forgive those who trespass against us. And lead us not into temptation, but deliver us from evil. Amen.



May the blessing of Almighty God, Father, Son and Holy Ghost, descend upon you all here this morning and remain forever.

At this point the visiting Philippine Commission, under the charge of Dr. Arthur W. Ferguson, came upon the stage.

**PRESIDENT RICHARDS:** We have the honor of having with us the Honorable Philippine Commission to the St. Louis Exposition. Dr. Ferguson, who is with us, will state to you the purpose of this Commission's visit to our country.

Dr. Arthur W. Ferguson then made a short address, stating the purpose of the visit of this Commission to the United States.

**PRESIDENT RICHARDS:** We will now listen to an address of welcome by George E. Chamberlain, Governor of the State of Oregon.

**GOVERNOR CHAMBERLAIN:** Mr. President, Ladies and Gentlemen: It affords me great pleasure to extend to you, the delegates to the American Mining Congress, on behalf of the people of Oregon, a cordial welcome to our state.

It matters not from whence you come, nor what flag floats over you when at home, the genial breezes of Oregon are balmy enough, the homes of our people hospitable enough, and the hearts of our citizens warm enough to insure each and every one of you a hearty reception and a pleasant stay amongst us.

Oregon feels that in honoring you she is honoring herself, for it is seldom indeed that any state has an opportunity to welcome as her guests a body of men so distinguished, not only in the fields of commercial and industrial enterprise and activity, but as well in governmental affairs of state and nation.

You have assembled here to consider problems affecting one of the greatest industries of our country, and to take steps looking to its advancement. It is well that to the settlement of these problems and the promotion of an industry so vital to the welfare of the world you have invited none but men who have achieved distinction in the various activities to which each has bent the best energies of his life.

Permit me to assure you that it is peculiarly gratifying to our people that Oregon was selected as a place for holding this, the seventh annual session of the American Mining Congress. Without disparagement to the phenomenal strides which, in the past few years, most of our sister states have made in wealth and population, I think I may safely claim that Oregon occupies no second place. For many years, and until quite recently, she occupied an almost isolated place in the sisterhood of states, cut off by lack of railroad and other transportation facilities from the great world of business and commercial enterprise. Truly, her motto, "*Alis volat propriis*," was peculiarly appropriate. She had none of those adventitious aids which other states have been able to claim to push her to the forefront, with the result that, while our neighbors have advanced more rapidly in material prosperity, Oregon now stands with outstretched hands, inviting those who will to come and exploit her practically undeveloped resources.

Even if my time were not limited, it would hardly be proper for me to do more than merely to call your attention to strides which our people have made in the last few years in everything that goes to the upbuilding and enrichment of a magnificent commonwealth. Immense bodies of land which until the past eighteen months have never felt the impress of the footsteps of man, and were considered as fit only for the desolate habitations of the coyote, the prairie dog and the jackrabbit, have been reclaimed from the desert, and with abundance of water, snatched by the cunning hand of man from snow-capped peak and mountain streams, are mantled with crops of cereals, hay and fruits, furnishing homes for thousands of sturdy men and women.

Sections of the state which in years gone by were deemed unfit for cultivation, have proven to be the most productive and of wonderful capability in the growing of cereals and other food crops.

The livestock interest, although many of the ranges have been converted into wheat, fruit and alfalfa fields, continues to grow in volume and value, as the facilities for breeding and feeding the vast herds of horses, cattle and sheep improve each year. Hills and valleys that were once deemed best adapted to the culture of wheat, have been reluctantly but profitably abandoned for these purposes, and here may now be seen magnificent orchards of apples, peaches, pears, prunes and cherries, which are coming to be known the world over for their excellence of form and flavor.

Portland, a few years since, without a single line of transcontinental railway to bring to her merchants the wares of the East or the products of the interior, now finds practically centered here five transcontinental railways and a line of steamers connecting them with the Orient. From a city of little importance she now occupies the fourth place in the United States, and promises you that in the next few years that she will not only occupy the first place in this regard, but will step rapidly to the front as a great exporting and importing point for the commerce between the new and the old East.

And how is it with the mineral resources of the state? They, too, are in the infancy of development. Notwithstanding this, she occupies the tenth place in the roll of states for the year 1903 as a gold producer, having credited to her score \$1,364,341, and the twelfth place as a silver producer, having credited to her account 125,000 fine ounces, of the commercial value of \$67,500. What a remarkable showing for a state that until a very recent date has practically made no effort to develop her mining interests. The magnificent mountain ranges that parallel each other from the northern to the southern boundaries of the state bear in their bosoms not only untold millions of gold and silver, but here, too, are mines of coal and copper and iron. All that is needed for the development of these is such splendid enterprise and brain and brawn as characterize the distinguished gentlemen whom we are to-day proud to hail as our guests. As a result of your visit to us I venture to predict that within another decade Oregon will make rapid advances to a first position as a rich producer of mineral wealth.

But how unfortunate it is that an industry of such vast importance to national and international commerce, and so magnificent in promise, has received so little attention at the hands of the lawmakers of state and nation. What has been heretofore accomplished has been due to individual enterprise and effort. Our country little realizes what it owes to you, gentlemen of this Congress, and to others like you who have braved the frost of winter as well as the prostrating and fever-laden heat of summer; who have coveted death in all its forms and shrunk from neither hardship nor danger in order to open up to an advancing civilization the great storehouses of nature. But you have yet new fields to enter upon and conquer, and you are here to devise the ways and means for successes in the future.

And first, you should make your voices heard in the halls of Congress. An industry of such importance to the world as is that which you have the honor to represent, should have a place in the Cabinet of the President. It was long before the rights of the great agricultural interests of the country were recognized by Congress, but now all appreciate the value of the Department of Agriculture. It was long before the law-making power could be made to see and appreciate the value of a Department of Commerce and Labor, yet who would now consent to its abolishment? These great interests were able to make themselves heard and understood, and constant knocking at the doors of Congress forced for them a reluctant recognition. Why cannot the mining interests of this great country of ours make their voices heard where others have been heard before?



Without the wealth that our mines afford and add each year to the capital of the commercial world, all industries would shrink and stagnation in all the fields of activity and enterprise would be the inevitable result.

And, second, there should be state recognition of the mining industry. Here, too, is a field open for your combined effort and enterprise. A bureau established with proper safeguards and restrictions so that it would be for the benefit of a class engaged in exploiting the rich resources of the state, and not for an individual whose sole aim and ambition is to draw a munificent salary, would do much to elevate, promote and stimulate the mining industry.

I might suggest other matters for your earnest and united consideration, but time and the proprieties of the occasion bid me leave such suggestions to men of wider and riper experience.

In conclusion, gentlemen, I bid you most cordial welcome. All we have to give is yours, while Oregon is honored by your presence. We ask you to enjoy our wealth of fruits and flowers, our fertile hills and beautiful valleys decked in gorgeous raiment of undying green; our lofty peaks, snow-capped and sun-crowned, rearing their massive heads to heaven here and there and everywhere, inspiring the hearts and minds of all beholders and bringing them to a realization of the near and majestic presence of the Almighty; our magnificent mountain ranges clad from crest to base with abundant and towering forests and bearing within their generous breasts riches that rival the wealth of "Ormus or of Ind."

These and all the beauties of sky and landscape with which a beneficent Providence has blessed us we bid you enjoy, and rest assured that Oregon and her people will feel amply repaid if when you return to your distant homes you will cherish none but pleasant memories of your visit here.

**PRESIDENT RICHARDS:** As it is now necessary for our guests from the Orient to take their departure, I suggest as a matter of respect that we remain standing while they leave us.

(The audience thereupon arose and remained standing while its guests departed from the hall.)

**PRESIDENT RICHARDS:** We will now be favored by an address by George H. Williams, Mayor of the City of Portland.

**MAYOR WILLIAMS:** Mr. Chairman and Gentlemen: When we speak of the Congress of the United States we understand that it is a body of representatives from all parts of the American Union assembled to make laws, and when we speak of the American Mining Congress we understand it to be a body of representatives from all parts of the same Union assembled to consider an industry in which all of the people of the United States are more or less interested. To constitute what may properly be called a Congress, a body assuming that name should have a national character.

Mining is the chief cornerstone of the business world. It is as much the foundation of our manufacturing industries as the earth is the foundation of the structures in which those industries are conducted. Mining products in the various forms and agencies into which they have been converted have done more for the advancement of trade and commerce than all other causes combined. Without iron, coal and copper as the basis of commercial appliances our transportation by land would go back to the pioneer days of pack mules and our transportation by water to the pettiness of the Indian canoe. Without iron there could be no steel, and without steel the machinery of our factories would be on a grade with the old-fashioned New England looms. Railroads, telegraphs and telephones would be impossible if there were no iron, steel or copper to be employed in their construction and use.

More than \$500,000,000 worth of coal was mined in this country within the last year and some opinion of its usefulness may be formed from the



distressing results of the coal miners' strike in Pennsylvania in 1902. No estimate can be made of the value of mining products in the transmission of intelligence, the creation and transportation of commodities, and in provisions for the comfort of the people.

All civilized nations refuse to recognize anything as real money that is not taken out of the bosom of the earth by the toil and sweat of the miner. Financial institutions everywhere depend upon gold and silver for their support. The business world, without gold and silver for a circulating medium, would be like the human system without blood in its veins. Lately there has been a great agitation in this country over the currency question, and we are told that it is settled. If it is settled, the miners have settled it. The miners of the country and not the politicians have established the gold standard. The gold miner with his pick ax has answered the argument for a cheap and fluctuating currency. Considering the interests involved, it seems that a mining congress is an appropriate if not a necessary institution. In a multitude of counsellors there is wisdom. There is a decided advantage in the consultation of men who have a practical knowledge of mining, for one man may know of ways and means for profitably conducting the business not known to another, and if each contributes what he knows to a common fund of knowledge, then the knowledge of all becomes the knowledge of each, and the knowledge of each the knowledge of all.

Science and experience produce new and improved methods of conducting mining operations. Congress ought not be inattentive to the mining interests of the country. Nature has stamped the country west of the Rocky Mountains with rough and rugged features, but to compensate for this has buried in its mountains, rocks and rivers, the precious metals in unstinted prodigality. California, Nevada, Utah, Montana, Idaho, Washington and Oregon are great states, all of which are bound together by a network of metallic veins whose riches are not unlike the wealth of "Orus and of Ind."

If it should be decided to fix a permanent place for the meetings of the Mining Congress, it seems to me that it ought to be somewhere in this large mining region, and I know of no location more desirable than the City of Portland for that purpose. Time was in the early history of the country when it was thought necessary for the convenience of the people that the meetings of a state Legislature should be located as nearly as practicable in its geographical center, but steam and electricity have exploded that idea, and the prevailing opinion now is that such meetings should be in the most prosperous, healthful and beautiful city of the state; but if geographical considerations are to weigh upon this question, then it is only necessary to say that Portland is midway between the vast mineral riches of Alaska, British Columbia and Washington and the mines of California, Nevada and Colorado. Portland is easily accessible by land and water. For all purposes of travel it is the terminus of three transcontinental railroads, and ocean-going ships from all parts of the commercial world fly their streamers in its harbor. Nowadays, when one starts on a journey it makes little difference whether he goes 500 or 2,500 miles, as traveling in a Pullman car or on a palatial steamship is little more than a luxurious respite from the labor and care of business at home.

It is not a sin to combine pleasure with business. Assuming that the meetings of the Mining Congress will be held in the summer time, as they now are, I can confidently say that there is no city in the United States in which the meetings of the Congress would be more pleasant than they would be in this city. Some days our sunshine is as hot as it is elsewhere, but the atmosphere is enlivened by a steady, cool breeze from Northern latitudes, so that the heat of the day is not oppressive, and the nights are always cool and comfortable. Our average summer temperature is about 66 degrees. We have no cyclones or blizzards, and storms accompanied by thunder and lightning are few and far between.

I have not witnessed more than a dozen of these since I came to Oregon over fifty years ago. Our city is supplied with water from a mountain stream thirty miles distant, and scientific examination shows it to be as free from impurities as any water that flows.

Excursions seem to be a fashionable part of conventions, and for such enjoyment you can go 100 miles up the Columbia River, whose magnificent scenery of towering cliffs, deep canons and splendid water falls is unsurpassed anywhere in grandeur and beauty; or you can go down the Columbia River 100 miles to the seaside and revel in the freshening breezes or bathe in the invigorating waters of the Pacific Ocean; or you can go by electric car lines into the rural districts of the state. Prolific sources of enjoyment for the sportsman may be found in forests, fields, lakes and rivers, easily accessible from Portland.

Portland is a prosperous and healthful city, and in scenic beauty and surroundings we believe it to be unequaled by any city. We are desirous of giving Portland that prominence to which it is entitled on account of its natural advantages and attractions, and we hope that the impressions made upon the members of this Congress at this meeting will be helpful to us in that direction. Portland feels flattered and honored by your meeting here. We are pleased to have with us so many representative men from all parts of our great country. We feel a deep interest in the subjects you will have to consider. Mining is one of the leading industries of Oregon. I am here to welcome you to this city. Whatever is good here, we want you to have, and whatever is beautiful here we want you to see. Make yourselves at home and be happy. I trust that your meeting will not only be of advantage to Portland, but of benefit to the whole country, and a credit and honor to the American Mining Congress.

**PRESIDENT RICHARDS:** We will now listen to a response to these addresses of welcome, by Honorable J. T. Small of the State of Maine.

**MR. J. T. SMALL, OF MAINE:** Mr. President and Gentlemen of the American Mining Congress: This is really a surprise to me to be called on so early in the proceedings of this Congress. I did not know until nine o'clock this morning that I was to respond in behalf of the good old State of Maine. I regret very much that our Chief Executive is not present himself, because I feel my inability to represent the State of Maine at this great Congress. But, Mr. President, I want to say to you that I listened to the remarks of the Honorable Mayor of Portland with great pleasure. While we are not known as a great mining state, we can produce the finest ice that is manufactured. We have the finest mineral springs that flow out of the known earth, the Cold Springs of Maine, only a few miles from the City of Lewiston, my native city. We have also forests in Maine. We have the finest kind of spruce, but it is getting a little scarce at the present time. We have sometimes to come to Oregon to get the masts for our ships that we build on the Kennebec River at Bath. You gentlemen, probably recognize and know the location of Bath. It is not only a lumber country and an ice country and a spring country, but, after all, gentlemen, we have some mines down in Maine; we have gold, we have silver, we have lead and we have copper. But we are so modest in our demands that we do not dare to branch out a great deal over this country and compete with you Western miners to sell stock. I think that I am safe in saying that I could load a good large roomy freight car with worthless mining stocks in New England. Now, that may look, apparently, as though I had exaggerated, but I don't think I have. I think they would have to be baled in order to get them into a freight car. Now, we in New England, are very much interested in this Congress and what is going to be done in regard to this matter of mining stocks and mining. I say to you, gentlemen—and I speak guardedly—that I have no doubt that there are more men in the State of Maine interested in mining than there are in the State of Oregon, I mean financially; men who have money invested in every mine I might



say, in the United States. Now, apparently, there are only a few of us here, but, gentlemen, every honest citizen of the United States who has a few dollars to invest is watching the actions of this Congress to-day to see what our deliberations will be looking to the protection of the investor, and it stands us in hand that we, as it has already been stated here this morning, use good sense and judgment and demand of the national Congress a representative in the President's Cabinet, for the greatest industry, in my judgment, the world knows to-day, mining.

Now, gentlemen, the State of Maine has sent out many people to build up other states, men who are making their homes, and whose sons and daughters are making their homes in this and other states, not only in Oregon, but in every Western state. You may go in any state west of the Rocky Mountains and find representative men from the State of Maine, and I hope and trust they are an honor to the State of Maine. It is an old saying that speech is silver, and silence golden, but dividends are the climax of all. So, let us work hereafter for the dividends.

PRESIDENT RICHARDS: We will now be favored by a response from the State of Utah, by Dr. Talmage.

MR. J. E. TALMAGE (of Utah): Mr. President and Members of the Congress: I assure you it is with peculiar pleasure that I respond to the request of my colleagues to step to the platform, make a graceful bow and say thank you in behalf of Utah, the young sister in our grand collection of states. I was not aware until I came into this room that this honor was reserved for me, but I embrace it all the more gladly and, in responding to the hearty welcome expressed by his Excellency, the Governor of Oregon, and by the Honorable Mayor of Portland, I can simply say that Utah appreciates the hospitality extended to our representatives here and to those who have come from other parts of the great United States of America.

Utah occupies a peculiar position, geographically speaking, in the great inter-mountain region, noted the world over for its enormous mineral wealth. I am hardly prepared to say, as has been so eloquently declared by the venerable Mayor of Portland, that we can claim so exactly a central and geographical position for Utah or any one of its cities as has been claimed, with respect to the great mining West; but I believe that the State I represent is located within easy reach of the great mining centers of the Rocky Mountain region, a region that tells of geological changes in the past, of great upheavals and mighty convulsions that have prepared the receptacles for gold, silver, copper and lead, and all the metals that go so far in making our industries what they are. I believe that Utah can express her thanks cordially because she hopes some day to hear an expression of the same kind from some of you coming within her doors.

Portland has been represented as an excellent city for the permanent headquarters of the Mining Congress. It would be perhaps with poor grace for me to take advantage of the opportunity offered me in speaking these few words of response to the welcome, to urge the claims of my own State in that connection. And since it may be invidious perhaps to compare state with state, I will say that while Utah is not in Salt Lake City, as some people have seemed to suppose, it is nevertheless a part of it, and I will add that Salt Lake City is proud enough to think of herself very much as Portland thinks of herself.

We have had many pleasant gatherings of this Congress in the past in the different states of the West, and sometimes beyond the eastern limit of what is generally known as the region of the Far West, and I believe every one has been attended with great results. From the heartiness with which the delegates have been here received, and from the kind assistance promised, I have no doubt that this, the seventh annual session of the American Mining Congress, of men interested in mining matters and in the development of this great industry, will be likewise productive of



great and lasting results, and if such be the case, Portland will have cause for an ever-living pride.

The words that have been spoken with respect to the establishment of a Cabinet office, and the appointment of an officer therefor, to represent the mining interests of the country, have been spoken in a proper place, and at a fitting time and in a very eloquent manner. And should any action taken here result in the attainment of that much desired end, I believe that the Department of Mines and Mining will always be thought of in future history in connection with Portland, the great City of the West. Therefore, we beg that a continuation of the assistance that is offered be rendered by Portland, and by Oregon, and by all the great states and cities of the Western region, in the attainment of this purpose.

Gentlemen, once again I say in behalf of Utah, I thank you most heartily for the welcome, and earnestly ask you to give us of Utah a chance to welcome you to our home.

PRESIDENT RICHARDS: We will be favored by a response by Mr. Zach Lamar Cobb from the great State of Texas.

MR. Z. LAMAR COBB, OF TEXAS: Mr. President and Gentlemen of the Congress, Ladies and Gentlemen: I appreciate the honor of appearing before you to respond to the cordial and eloquent words of welcome which have been spoken this morning, and in assuming this responsibility I only take courage through thinking of the people and of the region which I have the honor and privilege to represent. We have come a great distance to this Congress: from El Paso on the border of Mexico, to Portland, your beautiful city on the Pacific Coast, is a distance of over two thousand miles, and we have come every mile prompted by the interest we have felt in the purposes of this Congress. Every word that has been said by your honored Governor and by your distinguished Mayor, has met with a hearty response in the appreciation of our delegation from El Paso. What your Governor has said about the mountains and valleys has impressed us upon our trip into the city. But, sirs, when we return to Texas, when we leave Portland of the Northwest for El Paso, the great city of the great Southwest, I will return remembering one thing more than your highest mountains, more than your most fertile valley, more than anything I have seen; I will return to Texas happy in the rosebuds that I have seen in the cheeks of your Oregon women. And I am here to tell you, fellow citizens, that the people of Texas—that greatest and largest State in the American Union—are in accord with you in the interests of the mining industry. I believe that when the time comes Senator Bailey and Senator Culberson will be voting on the side of "Aye" in favor of the establishment of a Cabinet office for this department. I am here to say one thing more than that. When you, the people of this great Rocky Mountain region, help us, the people of the great Southwest, to give statehood to New Mexico and Arizona, there will be four more votes for you in the United States Senate.

This is a congress of miners; in appearance, if not in practical experience, I am a miner. I come to you as the representative of El Paso. While we are proud to be within the domain of Texas, it is not our claim alone to be one of her cities, but we come as the metropolis of the great Southwest. El Paso, seated on the border, is at the corner as it were of Texas, New Mexico, Arizona and Northern Old Mexico. Situated there, she is the metropolis of a vast region; it is six hundred miles before you come to a city of equal size. For three hundred and more miles we are unrivaled. There is no city to compete with us in this region. And in speaking to you a few words about mines this morning, within that region of which El Paso is the proud metropolis and in which she has no competitor, I come to contest the point advanced by your honored Mayor. He tells you that Portland is the center of the mining region. I tell you, fellow citizens, that taking as a whole the United States and Mexico—

the mineral producing country of the American continent—El Paso is the center and hub of it all. I would say nothing in disparagement of my friends from Salt Lake, but I ask you to look at the badges which they wear, and you will see that the map printed upon their badge shows that every claim of Salt Lake rests upon the staff of El Paso. The gentleman from Maine has well said that it would take a box car to hold the stocks held in his country. I might answer that it might take a box car to hold the mining stock sold from El Paso. But, friends and fellow citizens, it takes nine great trunk railroads to haul the mineral that is produced around El Paso. A few years ago El Paso and her region were comparatively unknown in mining; Arizona had but begun in the industry of copper mining. To-day around Bisbee and the other centers of Arizona, is produced one-fifth of the entire copper output of the United States. Across the artificial border between the United States and Mexico—in Northern Sonora, is a production of copper equivalent to that of Southern Arizona. So, friends, Northern Sonora and Southern Arizona combined produce copper equal to forty per cent. of the production of the United States. This is in the territory of El Paso. A few years ago mercury had never been mined in our portion of the country. To-day Texas, in her mines at Shafter, produces mercury in such quantities that she ranks second to only one state in the Union. Texas also, in her broad expanse, has sulphur deposits of such quality and extent when developed, as to supply the entire domain of the United States. New Mexico, with her variety of minerals, with her iron, stands ready to back El Paso. But, greater than this, Old Mexico, a place to be distinguished in the near future in the mining industry, is supplied entirely through the American gateway, El Paso, on the silvery Rio Grande. To-day Old Mexico produces more silver than the United States. The Northern part of Old Mexico shows an increase in the production of gold, while the United States shows a decrease for the past year. So, friends, I point you to El Paso, the mistress of three hundred and more miles around—El Paso, the center of mining in the great Southwest—El Paso, the gateway of Mexico, El Paso, the proud city and the metropolis of the Southwestern country. Now, speaking for the richest mining country on this American continent, scarcely started in its development as yet, a country of which I shall speak more to you later in this convention, speaking for Texas, Arizona, New Mexico and Northern Mexico; speaking for El Paso, the brightest jewel of an international diadem; speaking for my home and my town; speaking for the richest mining country of them all, El Paso, friends and fellow citizens, brings you greeting.

**PRESIDENT RICHARDS:** We will listen to a response from the last but not least—the Honorable J. T. Cornforth of Alaska, who had more to do with promoting the American Mining Congress than any other individual.

**MR. J. T. CORNFORTH (of Alaska):** Mr. President, Mr. Governor, Mr. Mayor, and delegates to this American Mining Congress: It is so long since I have met a body of mining men in session to discuss mining with them that I feel almost out of place. When I first went to Alaska they called me a "Che Chako." Afterwards they said I was a "Sour Dough." Now, returning to this convention, which I had a proud part in organizing seven years ago, I must say that I feel here that I am a "Che Chako" again, and not a "Sour Dough." Mr. Governor and Mr. Mayor, we thank you in the name of Alaska, but more particularly the Alaska Club of Seattle, for extending to us the welcome that you have. We come from the newest part of this great Republic representing a hardy and different set of men than now mine in the Middle United States, if we call it the Middle, for we in Alaska are yet nearly two thousand miles or more to the west of the older possessions of the United States; it is these people I represent, and for whom I am going to speak. You will bear with me when I say I had no expectation of saying one word to this Conven-



tion. I have never spoken in a convention of miners' organization. My voice has always been silent. I have felt that it would be more appropriate for scientific men to address you than a common mining man like myself. But, I will start to business, for a mining man always likes to commence business.

When this Mining Congress was first organized this country was experiencing hard times. This Mining Congress had its origin because of hard times. We felt that the miners were not receiving justice at the hands of our Legislators in Washington, and we felt that something must be done to restore mining to its proper position and so drive the prospector into new fields for the discovery of that which our Legislators demanded, gold. We in Alaska have given you gold, and we are going to give you more gold in ten years from to-day than Johannesburg in Africa gives to Great Britain. We organized this institution, believing it was for the best interest of the mining community that a Department of Mines and Metallurgy should be established to give to the miners the same benefits as the Department of Agriculture gives to the agriculturists, who send their soil to the Department for purposes of analysis and are informed in return what the soil is capable of producing. But lo, the poor miner receives no such consideration. I would like to qualify that. We have a Geological Department that does much for us, but we don't have a Department of Metallurgy to assist the prospector to the extent that he should be assisted. We need a department where our ores can be analyzed, not for gold and copper alone, but for the by-products, which are most profitable to the smelting interests. I remember an instance many years ago in Colorado, where a friend of mine was selling ore to be treated by a certain secret process, at about five hundred dollars per ton. He took it upon himself to send one carload of that same ore across the water to a foreign country, and after paying all charges upon that ore for smelting and separation, transportation and all other charges, he received over fifteen hundred dollars a ton instead of the five hundred that he had received from the same ore at home.

Gentlemen, I am speaking here for the prospector, the men who make the trails, the men who blaze the trees, the men who clear land, the men who make it possible for others to follow. The discoveries that have been made in Alaska in the last six years are greater than those that have been made in any other section of the world, under the same difficulties; and I say to you in all consideration, in regard to the production of gold, that I believe the production of gold in Alaska this year will be greater than in any previous year. But, remember that much of the gold of Alaska is paid for purchases made in Dawson, which is in the British Yukon country; and it is a great source of revenue to Dawson, in British Columbia, to receive the trade of the miners of Fairbanks and other centers of mining. That gold does not figure in the product of Alaska but is given to the production of the Yukon.

Gentlemen, further on in the Convention there are some points I desire to refer to. I wish to substantiate what the Governor of this great State, and the Mayor of this most beautiful and magnificent City, in which we are to be domiciled, have said. I should like to refer to the importance of mining, what relation it has to the prosperity of the United States. They spoke of the enormous production. But to simplify it so that we can better understand it, I have noted these facts:

"The factories and the manufactories of the United States, the varied industries, produce a tonnage for the railroads of one-seventh; the great forests give to the great railroads one-fifth of the tonnage; the farm products of which we hear so much, that there is an insufficiency of cars every year to move, and as to which it is said that other interests must stop for the purpose of moving this grain, it only produces one-ninth. The mines have produced more than one-half of all the tonnage that the railroads haul from port to port, from city to city."

(Applause.)



These are not new statements, but they emphasize the importance of mining in a way that should appeal to every man here, every delegate, to raise his voice in behalf of a Department of Mines and Metallurgy. I believe, if you will take these matters into serious consideration, you will see that we will have hard times no more; we will never have hard times, in my opinion, after the establishment of a Department of Mines and Metallurgy. I believe that the production of gold or the coinage of money in the United States will be of such importance that it will not only furnish the balance of the Old World with gold, but it will so enhance the value of everything that the farmer has to sell that the price of his wheat will not be fixed in London, but will be fixed in the United States of America. The miner likes to pay high prices; he wishes for high wages, he wishes for all Americans to prosper, and to have all of the good things of this earth, and that is the reason he is not opposed to the value of the products of the United States, enhancing in proportion to the production of metallic money, of gold money, which he will produce to pay all the debts that we owe, to continue their prosperity, and to give to every man everything that he desires, everything that will advance him in education and intelligence, and make a better citizen of him. Without money we have poor citizenship. We remember that it was the hard times that produced Coxey's army. We do not want these conditions to return. It is due to the wisdom and intelligence of the mining men who produce and give to the railroads something like fifty-three per cent. of the whole tonnage of the United States, to see that hard times should not be made at the pleasure of any one, but that the farmer and manufacturer and all classes and professions should go hand in hand, so that we may go on to that brighter galaxy so fittingly portrayed in the address given by the representative from the Lone Star State.

PRESIDENT RICHARDS then introduced Mr. B. B. Beekman of Oregon, who addressed the Congress in part, as follows:

MR. BEEKMAN (of Oregon): Mr. President and Gentlemen of the American Mining Congress: Imbued with a firm belief in the exceptional mineral resources and wonderful possibilities of Southern Oregon, the people of that section welcome with pleasure and delight the convocation of the American Mining Congress in this State. In common with other portions of Oregon they desire to attract attention to the opportunities here presented for safe and profitable investment. Confident that an investigation of this field will secure the favorable opinion and consideration of capital, the miners and the mining men of the State at large and of Southern Oregon in particular, have looked forward with eager anticipation to this occasion. They are hopeful that this gathering shall not only prove a source of pleasure, instruction and profit to delegates and visitors, but that it will also materially contribute to the growth and upbuilding of the mining industry throughout the State.

Acting upon the suggestion of Mr. George H. Himes, the assistant secretary of the Oregon Historical Society, the Board of Trade of Jacksonville, the oldest town in Southern Oregon, and concededly the oldest mining town in the State, now avails itself of the privilege and opportunity of presenting to the President of your body an appropriate souvenir of this occasion. As a native-born of that old mining town, and as the representative of its people and its Board of Trade, and on behalf of the people of Rogue River Valley and of Southern Oregon in general, I now take pleasure in presenting to you as a token of appreciation of the presence of this Congress here, and of the aims and purposes of this organization, this gavel, fashioned from the beautiful wood of a manzanita that grew upon Rich Gulch, the scene of the first big gold discovery in this State, and adorned with a plate made of gold dug during the spring of this year from the despoiled but still somewhat auriferous bed of that same old gulch. It bears appropriate inscription, and we trust that it will serve as a pleasing reminder of a pleasant sojourn in our midst.

With it we extend our heartiest greetings and most cordial welcome to you all, and express the hope that when your deliberations here are ended many of you will find it convenient and opportune to visit the scenes of the early days of gold mining in Oregon.

PRESIDENT RICHARDS responded in part, as follows: This gavel, in the hands of him whose right it is to preside, typifies authority. When wielded by intelligence, it commands respect and compels obedience; but when wielded by ignorance there are none so poor to do it reverence. It will only be through your kind assistance and generous consideration of the many weaknesses your chairman may possess that I shall be able to wield it with that character of intelligence which is fitting a body of this kind.

This gavel, I am fully conscious, was not a gift to me personally so much as to express an historical event relative to the progress of mining, through the American Mining Congress, and in that light it speaks of the explorers, Lewis and Clark, who revealed this great Northwest to the civilized world; it speaks of those who followed them, the emigrant, the pioneer that marked his pathway across the plains to the mountains, of those who, grown weary with an almost endless journey and hardships, fell by the wayside. It speaks of the prospector, the man who sleeps beneath the stars in the summer time, burrows in the snow in the winter, and reveals to humanity the riches of the mineral world.

So far as this present pertains to myself, I have no adequate language to express my gratitude. That can only come through fidelity and fitness for the duties you have called upon me to perform. So far as it pertains to the Mining Congress, I know that I have the right and authority in the name of the Congress to thank those gentlemen for the kindly sentiments they have expressed and the purpose they intended to perpetuate as an historical event in the history of mining in this country, and in the name of the Congress I thank them.

PRESIDENT RICHARDS: The Secretary has some announcements to make, after which an adjournment will be in order.

MR. R. C. PATTERSON, OF OMAHA, NEBRASKA: Mr. President: Before we adjourn this session I would like to make a motion that the Chair appoint a committee whose duty it shall be to prepare a set of resolutions, in memory and in honor of that one who has departed this life since we last met, the Hon. John T. Grayson, a member of this body and an honored officer. And I would move you, sir, that a committee of three be appointed by the Chair to prepare such resolutions and to present the same to this body before the session closes.

The motion was seconded, and upon being put by the Chair, was declared carried.

PRESIDENT RICHARDS: I will announce the Committee at the incoming of the session this afternoon.

MR. STAPLES, OF FALL RIVER, OREGON: I would like to announce that I have in my possession two thousand dollars' worth of specimens from the section of which Mr. Beekman has just spoken, and as soon as a place can be provided I intend to place them on exhibition.

PRESIDENT RICHARDS: We will look after it. I announce the following members to compose the Committee on Resolutions: Dr. E. R. Buckley, Missouri; Prof. J. E. Talmage, Utah; E. G. Reinhart, Colorado; Col. Thomas Ewing, California; J. Frank Watson, Oregon; C. L. Dignowity, Pennsylvania; J. T. Small, Maine; Hon. H. S. Hamlin, Colorado; F. Wallace White, Ohio; Col. F. V. Drake, Oregon; Prof. E. Haworth, Kansas; Hon. O. W. Powers, Utah; Hon. J. F. Callbreath, Colorado; M. D. Leehey, Washington; Jas. H. Lynch, Montana; Hon. G. W. E. Dorsey, Nebraska; T. A. Rickard, New York; E. B. Braden, Montana; S. F. Emmons, Washington, D. C.; J. W. Malcomson, Texas.



To constitute the Committee on Credentials, the Chair announced the following:

Philip S. Bates, Oregon; M. P. Gilbert, California; R. C. Patterson, Nebraska.

**PRESIDENT RICHARDS:** Relative to the question of resolutions, under the by-laws of this organization, each resolution must be read in open session and then will be referred to the Committee on Resolutions for its action. A meeting of the Committee on Resolutions will be held at 1:30 o'clock P. M., headquarters, Third Infantry, left side of hall going out.

Thereupon, upon motion duly seconded and carried, an adjournment was taken to 2 o'clock P. M.

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### FIRST DAY—AFTERNOON SESSION.

August 22, 1904, 2 o'clock P. M.

The Congress was called to order by the President.

The Secretary announced that regular meetings of the Committee on Resolutions would be held daily at 8 o'clock A. M. in the Field and Staff Office near main entrance of the Armory.

That a special meeting of said committee would be held at the same place immediately after adjournment of the morning and afternoon sessions.

The Secretary read the following resolution offered by O. W. Powers of Utah:

Resolved, that the special order of business for Thursday at 2 P. M. shall be the consideration and determination of the permanent headquarters of the American Mining Congress.

The Secretary also read Resolution No. 4, offered by Dr. E. R. Buckley, amending Article 12, Section 1, and Article 13, Section 3.

Also a resolution known as Resolution No. 1, introduced by J. H. Richards, advocating a Department of Mines and Mining.

**PRESIDENT RICHARDS:** Under our by-laws these resolutions will be referred to the Committee on Resolutions. The question relating to the amendment of the by-laws requires twenty-four hours' notice, so that after the expiration of twenty-four hours' notice the question which has just been read can be taken up.

**PRESIDENT RICHARDS:** At the suggestion of the Executive Committee it becomes my privilege and duty to present to you the annual address of the President of this Congress. It is also suggested by the Committee, perhaps for reasons best known to them, that I read this address so that it may be exact, expressing clearly just what was intended to be expressed. So, if you will bear with me for a time I will read this address.

The President's address will be found in Part II. of this report.

**PRESIDENT RICHARDS** then introduced Mr. W. D. Fenton of Oregon, who delivered a very interesting address on the subject, "The Lewis and Clarke Exposition."

**PRESIDENT RICHARDS:** We will listen to an address by Mr. Harvey W. Scott of the Oregonian. His subject is "The Relation of Mining to the World's General Advancement."

This address will be found in Part II. of this report.

**PRESIDENT RICHARDS:** This closes the program as provided by your Committee on Program for this session. What is your further pleasure?



MR. HARRY S. JOSEPH, OF UTAH: I would like to ask with reference to resolutions, what is the decision of the Chair as to when resolutions may be introduced by members.

PRESIDENT RICHARDS: They may be introduced at any time when no other business occupies the attention of the Congress, then read and referred to the Committee on Resolutions.

MR. HARRY S. JOSEPHS, OF UTAH: Mr. Nichols has a resolution to introduce.

PROFESSOR NICHOLS: I have the following resolution to introduce this afternoon:

Resolved, that Thursday afternoon at 2 o'clock be fixed as the time for determining where the permanent headquarters of the American Mining Congress shall be fixed."

PRESIDENT RICHARDS: I have been requested by the Chairman of the Committee on Credentials to request you at the close of this session to bring your credentials into the corner room as you go out of the hall.

MR. H. S. JOSEPH, OF UTAH: Mr. President: I have a resolution to offer, which I will read:

"Whereas, by the late decision of the Secretary of the Interior, upon the interpretation of the Teller law relating to the survey of mineral lands whereby monuments on the ground should govern, and not the description of the patent thereof in the survey of an adjoining claim; and,

Whereas, such interpretation will work vast injury to the present patented mining lands by reason that it would open the way to falsify positions of mining claims;

Resolved, that it be the sense of the American Mining Congress in convention assembled at Portland, Oregon, August 22nd to 27th, 1904, that such interpretation be reversed by the Secretary of the Interior, so that the description of mining claims as indicated in the patent thereof and on file in the office of the various surveyor generals of the different States of the United States govern in a survey of all adjacent mining claims.

Resolved, further, that a copy of this resolution, together with the recommendation thereof, be forwarded to the Secretary of the Interior.

PRESIDENT RICHARDS: The resolutions and the documents will be referred to the committee.

On motion duly seconded the Congress adjourned until August 23, 1904, at 10 o'clock.

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## SECOND DAY—MORNING SESSION.

August 23, 1904, 10 o'clock, A. M.

The President called the Congress to order.

The Secretary read the following announcements:

Notice is hereby given that the regular meeting of the Committee on Resolutions will be held daily at 8 A. M.

A special meeting of the Committee on Resolutions will be held Tuesday immediately after adjournment of the opening session of the Congress.

The following resolutions were offered:

By T. A. Rickards, of New York:

Whereas, this Congress earnestly desires to see the business of mining placed on a safe basis; therefore, be it

Resolved, that this Congress records its appreciation of the successful efforts of the Post Office Department of the National Government in preventing the misuse of the mails for fraudulent mining schemes.

PRESIDENT RICHARDS: The resolution will be referred to the Committee on Resolutions.

An invitation was extended to the Congress by George H. Himes, Secretary of the Oregon Historical Society, to visit the rooms of the Society at the City Hall.

The Secretary read the following report of the Committee on Resolutions:

Committee Room, August 22, 1904.

The Committee on Resolutions respectfully reports back the following resolution, designated as Resolution No. 2, introduced by Hon. O. W. Powers of Utah, and, by unanimous vote, recommends its adoption by the Congress.

J. E. TALMAGE, Secretary.

E. R. BUCKLEY, Chairman.

#### RESOLUTION NO. 2.

By O. W. Powers:

Resolved, that the special order of business for Thursday at 2 P. M. shall be the consideration and determination of the location of the permanent headquarters of the American Mining Congress.

Committee Room, August 22, 1904

The Committee on Resolutions respectfully reports back the following resolution, designated as Resolution No. 1, introduced by Hon. J. H. Richards, of Idaho, and, by unanimous vote, recommends its adoption by the Congress.

J. E. TALMAGE, Secretary.

E. R. BUCKLEY, Chairman.

#### RESOLUTION NO. 1.

Whereas, the settlement of our vast public domain under the direction of the Department of the Interior, has of itself more than justified the creation of this department of our government; and,

Whereas, the benefits already received by the people of the United States through the influence of the Department of Agriculture, demonstrate the wisdom of establishing this department as one of the great executive branches of our government; and,

Whereas, the Department of Commerce and Labor is constantly presenting conclusive evidence of the usefulness of such a department in wisely directing the great interests coming within its jurisdiction; and,

Whereas, the successive establishment of these departments of our government (at the different stages of economic development of the United States) has fully demonstrated the usefulness of this manner of co-operation by our government in meeting the ever-expanding industrial needs of the people; and,

Whereas, the mining development of this country, if wisely directed, will add a much needed element of permanency and stability to present industrial progress; therefore, be it

Resolved, that The American Mining Congress in annual session assembled, believing that the time has arrived when a Department of Mines and Mining would be the means of placing the mining industry on a plane commensurate with its importance to all industrial progress, urges the Congress of the United States to at once create a Department of Mines and Mining as one of the great executive branches of our government.

PRESIDENT RICHARDS: I now have the pleasure of introducing to this audience the Hon. F. H. Newell, of the United States Reclamation Service, who appears here at the request of the President of the United States, who will now address you.

Mr. Newell's address will be found in Part II. of this report.

PRESIDENT RICHARDS: It gives me great pleasure to present to you Mr. Gifford Pinchot, who represents the United States Forest Reserve, who will now address you.

Mr. Pinchot's address will be found in Part II. of this report.

The Secretary read the following resolution, offered by Mr. Frank V. Drake, of Oregon:

Whereas, the establishment of assay offices, located with great care, so as to best accommodate the great mining districts in the different sections of the United States, are great aids in the development of the mining industry of America; therefore,

Resolved, that this Congress recommends to the Congress of the United States the establishment of such assay offices at appropriate locations in different sections of the United States, the locations of which to be selected with great care; and,

Whereas, at the last session of Congress, Senate Bill No. 280, entitled "A bill to establish an assay office at Portland, Oregon," was reported unanimously from the Senate Committee on Finance, and passed the Senate without a dissenting vote, which bill is now pending before the Committee on Coinage, Weights and Measures of the National House of Representatives; and,

Whereas, the State of Oregon is rapidly developing into one of the richest mineral States in the Union, having, according to the report of the Geological Survey, produced between the years 1862 and 1902, gold and silver of the aggregate value of \$115,000,000; and

Whereas, the State is divided into three great mineral districts, namely, Eastern Oregon, Middle or Central Oregon and Southern Oregon; and,

Whereas, the nearest assay office to any portion of these vast mineral districts is Boise, Idaho, on the east; Seattle, Washington, on the north, and San Francisco, California, on the south; and,

Whereas, it is, in the judgment of this Congress, important in the interest of the general development of the mineral industry of the United States that an assay office should be established at the City of Portland, in the State of Oregon; therefore, be it further

Resolved, that this Congress favors the passage of said bill through the National House of Representatives at the next session of Congress, and earnestly appeals to the House Committee on Coinage, Weights and Measures, and to the National House of Representatives, to give said bill favorable consideration at its next session.

The resolution was referred to the Committee on Resolutions.

PRESIDENT RICHARDS: I know that you will all be pleased to know that your Program Committee has been enabled to provide you with an address from United States Senator John H. Mitchell, of Oregon, on the subject of the last resolution.

HON. JOHN H. MITCHELL, OF OREGON: Mr. Mitchell then addressed the meeting at length upon the establishment of an assay office at Portland.

PRESIDENT RICHARDS: You will now have the pleasure of listening to an address on Mining Law by Mr. Maurice D. Leehey, of Washington.

This paper will be found in Part II. of this report.

MR. STEELE OF ALASKA: Mr. President, I have a resolution which I would like to read to the Congress:

Whereas, the District of Alaska has a population of nearly 70,000 American citizens, a large majority of whom are miners and prospectors; and,

Whereas, these pioneers have no way of obtaining redress for their grievances, except by a personal appeal to Congress; and,



Whereas, these appeals must be made to Representatives or Senators from other localities who have the welfare of their own districts and constituents to care for, and consequently these personal appeals have as yet been of no avail or benefit; and,

Whereas, it is the wish and desire of all Alaskans that they be represented in Congress of the United States by a delegate elected by the popular vote of the people, to the end that such laws may be enacted that will be to the benefit of mining and other interests; therefore, be it

Resolved, that The American Mining Congress, in its regular convention assembled in Portland, Oregon, August, 1904, does heartily indorse this wish of Alaskans, as by so doing the great mineral storehouses of the North Land will be more speedily developed; and, be it further

Resolved, that this Congress will use every honorable means to secure to Alaska that representation our forefathers fought for at Bunker Hill; and, be it further

Resolved, that this Congress appeal to the Congress of the United States for their consideration at the next session, asking for immediate action, to the end that these hardy Americans may enjoy the privilege of representation according to the rights guaranteed in our Constitution

The resolution will be referred.

**THE PRESIDENT:** This closes the program arranged by your Program Committee. The chairman of that committee desires to make an announcement.

**MR. R. C. PATTERSON, OF OMAHA:** Mr. Patterson then made a few remarks relative to the program, referring especially to the address to be given by Chancellor E. B. Andrews.

**A MEMBER:** I move you that we adjourn until 2 o'clock.

**PRESIDENT RICHARDS:** There are some resolutions that have been presented and acted upon by your Committee on Resolutions which we might act upon at this time if the Congress is ready to take them up.

**MR. THOMAS EWING, OF CALIFORNIA:** I move that the resolution on the establishment of a Department of Mines and Mining, which is the most important one, be taken up.

The motion was seconded.

**PRESIDENT RICHARDS:** It has been moved by Col. Thomas Ewing that the resolution in relation to the Department of Mines and Mining be now adopted. Are you ready for the question?

**MR. H. S. JOSEPH, OF UTAH:** Let it be read.

The Secretary read the resolution and the report of the committee thereon.

**MR. E. R. BUCKLEY, OF MISSOURI:** I wish to say with reference to this resolution that I hope every member of the Congress who is present this morning will vote "aye" on this resolution. Vote "aye" in no uncertain voice, that the vote on this resolution may be heard from here to the Congress of the United States.

**MR. H. S. JOSEPH, OF UTAH:** I move as an amendment to the resolution that a copy of these resolutions when adopted be forwarded to Hon. Theodore Roosevelt, President of the United States.

**MR. J. T. CORNFORTH, OF ALASKA:** I move a change in the name. I move that the name of the Department shall be, instead of "Mines and Mining," "Mines and Metallurgy." I believe that it would better convey to the people the requirements of the department, in establishing a system of analyses and analytic work in chemistry, a subject that is most essential for the success of the Department of Mines and

Metallurgy. Therefore, I make the motion to change the name, and ask to refer it back to the committee on the wisdom of the change and to present it here, if found desirable, with that name attached to it. I am going to ask, at least, if my motion is not seconded, that it be referred back to the committee for the discussion of the question of the change of the name.

The motion of Mr. Cornforth was seconded.

PRESIDENT RICHARDS: It has been moved and seconded that this resolution be amended by striking out the word "Mining," and inserting the word, "Metallurgy," so that it will read, "A Department of Mines and Metallurgy." Are you ready for the question on the amendment?

MR. E. R. BUCKLEY, OF MISSOURI: I might say for the information of the members of the Congress, that that matter was taken up in the Committee and thoroughly discussed. It is not the purpose of this committee to dictate what that department shall be named. Whether it be named a "Department of Mines and Mining," or "Department of Mines and Metallurgy," we do not know. Throughout the history of this Congress, throughout its seven years of existence, we have been asking the National Congress to establish a Department of Mines and Mining, and the mining fraternity throughout the country have known that we have been asking for a Department of Mines and Mining. Therefore, it was the purpose of the committee to retain this name, in conformity with the other resolutions which have been passed by this Congress at previous sessions. When the department is established it will remain with the committee, appointed by the Congress, to determine the name by which that department shall be designated. That is why the Committee on Resolutions adopted the name Department of Mines and Mining. We even went so far as to consider the advisability of suggesting that the name be, instead of a Department of Mines and Mining, simply a Mining Department, leaving entirely optional with the Congressional Committee the naming of that department. We eventually decided upon the name, "Mines and Mining," in conformity with former resolutions adopted by this Congress, and in conformity with the impression which has gone abroad throughout the world that we are urging a Department of Mines and Mining.

MR. JOHN DERN, OF UTAH: I fully agree with the gentleman from Missouri. From the very beginning, all of our resolutions have read, that we asked for a Department of Mines and Mining. It is not necessary in creating a department of that kind that we shall designate all the different parts of it. Metallurgy is part of mining, just as much as horticulture is a part of agriculture. We have a Department of Agriculture. It does not specify horticulture, or other branches of agriculture, but it is all taken in the same field and for the same purpose, and I believe it is well, inasmuch as we have asked for these several years for a Department of Mines and Mining, under that title, that we should not change that now, but leave it as it now appears in the resolution.

MR. R. C. PATTERSON, OF OMAHA: Gentlemen, I am opposed to the change of the name from Mines and Mining to that of Metallurgy, for the simple reason that metallurgy is a technical name, and the public at large do not understand exactly what metallurgy means. Now, we don't mean to confuse people by talking to them, but we mean to talk to them in a manner that they will understand; and for that reason, if for no other, I would oppose changing the name from Mines and Mining to that of Mines and Metallurgy. Metallurgy applies largely to chemistry, and is used by professors in that line of work, and if we wanted to decide what kind of a mill to build for our ores, we would, as a rule, send a carload of our ore to the metallurgist. Who is a metallurgist? many of the people will ask. He is a man that is versed in that particular

speciality. Now, everybody understands the term Mines and Mining; the boy understands it, the girl understands it, the father and the mother understand it, and why should we change it to a technical name when we are striving, as the gentleman from Utah has said, to get that which we want and that which the people understand, and when the resolutions that have been adopted from year to year and from time to time have been under the head of Mines and Mining?

Now, Mr. President, I wish to make a motion, and move as an amendment to the amendment that when this resolution is adopted that a copy of the resolution, certified to by the President and Secretary of this Congress, shall be sent, not only to the President of the United States, but also to the President of the Senate of the United States, to the Speaker of the House of Representatives, and to the Secretary of the Interior, making four different departments, in order that they may know what we have done and why we have done it.

PRESIDENT RICHARDS: Would it not be well to withdraw that last amendment and let the question stand on its merits?

MR. R. C. PATTERSON, OF OMAHA: All right.

MR. J. T. CORNFORTH, OF ALASKA: I withdraw the motion. I am very glad to hear the explanation from the gentlemen present. I think we have cleared up a great mystery to everybody, what Mines and Mining mean. I believe it embraces all of the departments of the reduction of the metals in general and I am only too glad to withdraw the motion, in view of the explanations of the gentlemen from Utah and Missouri.

PRESIDENT RICHARDS: The gentleman from Alaska is out of order. It is in the hands of the Congress. Are you ready for the motion, the amendment striking out the word "Mining" and inserting the word "Metallurgy"?

A MEMBER: The gentleman withdrew his amendment.

PRESIDENT RICHARDS: He has no right to withdraw it.

MR. R. C. PATTERSON, OF OMAHA: Please make that clear again to us.

PRESIDENT RICHARDS: Mr. J. T. Cornforth of Alaska made a motion to amend the resolution by striking out the word "Mining" and inserting in lieu thereof the word "Metallurgy," so that it will read as amended, "A Department of Mines and Metallurgy." Then the gentleman from Alaska offered to withdraw his motion, but it having been submitted to the Congress, the Chair ruled that out of order. The question now recurs on the amendment, striking out "Mining" and inserting the word "Metallurgy." (Putting the question.) It is lost. Now, the question recurs on the original resolution. (Putting the question.) The "ayes" have it, and the resolution is unanimously adopted.

The President recognized Mr. H. S. Joseph of Utah.

MR. H. S. JOSEPH, OF UTAH: I will give the floor to Mr. Patterson to offer a motion now to send a copy to the different offices of the United States.

MR. R. C. PATTERSON, OF OMAHA: I was going to offer an amendment to the amendment, but I believe that is not necessary now, is it?

PRESIDENT RICHARDS: No, the resolution has been carried and your motion will now be in order, an original motion.

MR. R. C. PATTERSON, OF OMAHA: I would move you, sir, that a certified copy of this resolution that we have just now adopted be sent



to the President of the United States, to the Speaker of the House of Representatives, to the President of the Senate, and to each Senator of the United States and to each member of the House of Representatives.

MR. H. S. JOSEPH, OF UTAH: I second the motion.

The President stated the motion, and upon its being put to vote declared it carried.

PRESIDENT RICHARDS: There are some further resolutions here, if you desire to act upon them.

MR. PATTERSON, OF NEBRASKA: Mr. President, I will call up Resolution No. 2 and ask for action upon it. It is the resolution in regard to the location of the permanent headquarters.

The Secretary read the resolution and the report of the committee.

MR. JOSEPH, OF UTAH: I move that said resolution be adopted in accordance with the recommendation of the committee.

The motion was seconded and the resolution was adopted. (Said resolution and committee report are set out in the proceedings of yesterday.)

The Secretary read a resolution offered by John M. Cleary of Clarke County, Washington. (Said resolution is set out in the proceedings of the third day, with the report of the committee thereon.)

PRESIDENT RICHARDS: The resolution will be referred to the Committee on Resolutions.

MR. JOHN G. GIBENS, OF WASHINGTON: Mr. President, I wish to offer the following resolution:

Whereas, in view of the abuse in Alaska of the privilege of locating claims by power of attorney; be it

Resolved, by the American Mining Congress, that we favor and recommend appropriate legislation by the National Congress amending the mining laws and their application to Alaska, so as to afford relief from the present evils by location under the power of attorney.

PRESIDENT RICHARDS: It will be referred to the Committee on Resolutions. Senator Mitchell desires to say a few words.

HON. JOHN H. MITCHELL, OF OREGON: Mr. Mitchell then urged a large attendance at the evening meeting, to listen to Chancellor Andrews' address.

MR. E. R. BUCKLEY, OF MISSOURI: I wish to make an announcement. The Committee on Resolutions meets every morning at 8 o'clock. If there is any member of this Congress who desires to introduce a resolution, that resolution should be in the hands of this committee by to-night. Please do not delay offering your resolutions. If they are presented later than to-day they may not be acted upon.

Thereupon the Congress adjourned to 2 o'clock P. M. August 23, 1904.

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## SECOND DAY—AFTERNOON SESSION.

The Congress convened August 23, 1904, at 2 o'clock P. M.

THE PRESIDENT: The first exercise on our program is an address by Col. F. V. Drake on "Minerals and Mining."

Mr. Drake's paper will be found in Part II. of this report.

PRESIDENT RICHARDS: I have the honor to introduce to you Mr. T. A. Rickard of New York, the editor of the Engineering and Mining Jour-

nal, who was specially appointed by the President of the United States as a delegate to this Congress.

Mr. Rickard's address will be found in Part II. of this report.

**PRESIDENT RICHARDS:** The program now calls for an address by Colonel Crawford, who is not present; an address by ex-Governor Daggett of California, who appears not to be present, and also an address by Mr. O. P. Brown on "Cyanide Ores of the Ragged Top District of the Black Hills," who also is not present. The Secretary has an announcement to make.

The Secretary read a communication from the Oregon delegation concerning the Eddy Corporation Tax Law of Oregon, which was referred to the Committee on Resolutions.

The following papers were read by title:

Concentration of Copper Ores in the Southwest, by Frank H. Probert.

The Geology and Mineral Resources of Idaho, by Robert N. Bell.

The Mineral Resources of Wyoming, by H. C. Beeler.

The Mineral Resources of Vermont, by G. H. Perkins.

It was moved and seconded that said papers be printed in the proceedings of the Congress. Carried.

These papers will be found in Part II. of this report.

**PRESIDENT RICHARDS:** The Secretary will now read the report of the committee appointed on permanent location of business headquarters.

The Secretary read, as follows:

To the President, Officers and Members of the American Mining Congress:

Your Committee on Building and Location of Permanent Headquarters for the Congress beg leave to report as follows:

The Secretary of the Congress has given notice to a number of cities to make application through the proper channels expressing their desire for such location of such headquarters. Of these only two cities have expressed a desire to obtain the honor—Denver, Colorado, and Salt Lake City, Utah, have taken up the matter and their representatives are here to press their claims.

These cities are both favorably located in the central part of the mining country, and either would be desirable. Both will offer desirable land for the building of suitable buildings, as well as financial aid. No doubt the Legislature of either of these states would appropriate money for the aid of the Congress. When the headquarters is permanently located there is but little question that large subscriptions can be obtained from successful mining men and others, this money to be expended in the construction of suitable buildings, and the support of the same, where the ores of the country can be placed on exhibition to remain there permanently. This cannot be done while we are tramping from place to place, without buildings or headquarters of any kind.

The committee would strongly recommend that one of these two cities be selected, and desirable terms made with them for the building and grounds required by this Congress.

Respectfully submitted,

THOMAS EWING, Chairman.

**PRESIDENT RICHARDS:** You have heard the report of the committee appointed on Permanent Headquarters read. What is your pleasure with this report? A motion to adopt it will be in order.

**MR. H. S. CLARKE, OF BUTTE, MONTANA:** I move that the report of the Committee be adopted.

The motion was seconded, and upon being put to vote by the Chair, was declared adopted.

**MR. R. C. PATTERSON, OF OMAHA:** Has the Committee on Memorial Resolutions reported?

PRESIDENT RICHARDS: The Chairman has not appointed that committee, but I will attend to it at once.

A MEMBER: Was not there a Committee on Credentials appointed?

PRESIDENT RICHARDS: That committee has been appointed, but has not yet reported. Mr. Bates of Portland is chairman of that committee.

MR. R. C. PATTERSON, OF OMAHA: That committee will report as soon as all of the credentials are in. There are more expected to be here to-night and to-morrow, and the Committee on Credentials will probably not be able to report until Friday morning at 10 o'clock.

PRESIDENT RICHARDS: It will probably be necessary to have the report by Thursday noon.

MR. H. S. JOSEPH, OF UTAH: It seems to me the Committee on Credentials have had ample time to attend to their duty. Other committees, and I am proud to say among them the Program Committee, have attended to their duties in due time. It seems to me the Credentials Committee ought to come in with their report not later than Thursday morning.

MR. R. C. PATTERSON, OF OMAHA: I withdraw what I said about Friday morning; I meant Thursday morning, because I knew there was a vote to be taken here Thursday afternoon probably, and we will want to know who are entitled to vote, and the committee will report not later than Thursday morning at the opening of the morning session.

PRESIDENT RICHARDS: I might suggest that it is going to be an important question, as I understand, for you to consider whether you can vote by proxy; that is one question under this character of incorporation; and the other question is whether or not a delegate who is not a member can vote on a business matter of the corporation. Those two questions, if possible, ought to be decided at this session.

MR. R. C. PATTERSON, OF OMAHA: I am glad you have made the suggestion. Inasmuch as we seem to have a few minutes to spare, would it not be wise to hear from those who have something to say on that point?

MR. H. S. JOSEPH, OF UTAH: In order to bring Mr. Patterson's proposition before the Congress, I now move you that the report of the Credentials Committee be made a special order for 10 o'clock Thursday morning.

The motion was seconded, and upon being put to vote by the Chair, was declared carried.

Thereupon the Congress adjourned to 8 o'clock P. M., August 23, 1904.

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## SECOND DAY—NIGHT SESSION.

The Congress convened August 23, 1904, at 8 o'clock P. M.

PRESIDENT RICHARDS: It is one of the pleasing duties of my official experience to introduce the gentleman who will address you to-night. He is of robust manhood, he met with an accident to-day, but I am informed that he is not an object of sympathy, and he says he thinks the audience is to be sympathized with to-night. I have the pleasure of introducing to you Chancellor E. B. Andrews of Nebraska, who will now address you.

Chancellor Andrews' address will be found in Part II. of this report.



A MEMBER: I move that this audience extend a vote of thanks to Chancellor Andrews for his masterly address.

The question was called for, and, upon being put by the Chair, was declared unanimously carried.

PRESIDENT RICHARDS: The Secretary has some resolutions he desires to read.

The Secretary read the following resolution:

Committee Room, August 23, 1904.

The Committee on Resolutions respectfully reports back the following resolution, designated as Resolution No. 4, introduced by Dr. E. R. Buckley, of Missouri, and, by unanimous vote, recommends its adoption by the Congress.

E. R. BUCKLEY, Chairman.

J. E. TALMAGE, Secretary.

Received August 23, Afternoon Session.

#### RESOLUTION NO. 4.

By E. R. Buckley: Amend Article 12 by striking out the word "Congress" in the second line of Section 1, and all of Section 2, and inserting in line one (1) of Section one (1) before the word "place" the words "time and" and substituting for the word "Congress" in the second line the words "Board of Directors," so that the article as amended shall read as follows:

#### ARTICLE XII.

Section 1. The time and place of holding the annual session shall be determined by the Board of Directors.

Also amend No. 13, Section 3, by striking out all of the first sentence and the first five words of the second sentence, including "This shall be followed by," and adding to this sentence the words "shall be a special order for two o'clock on the afternoon of the last day," so that the section, when thus amended, shall read as follows:

Section 3. The election of the Board of Directors and the adoption of a resolution addressed to the Board of Directors naming those to be elected by the Board as Officers of the Congress for the ensuing year shall be a special order for two o'clock on the afternoon of the last day.

PRESIDENT RICHARDS: What is your pleasure as to the resolution as read?

MR. E. R. BUCKLEY, OF MISSOURI: I will move you that the report of the committee be adopted.

The motion was seconded, and, upon being put by the Chair, was declared adopted.

The Secretary read the following resolution and report:

Committee Room, August 23, 1904.

The Committee on Resolutions respectfully reports back the following resolution, designated as Resolution No. 6, introduced by Judge Richards of Idaho, and, by unanimous vote, recommends its adoption by the Congress.

E. R. BUCKLEY, Chairman.

J. E. TALMAGE, Secretary.

#### RESOLUTION NO. 6.

By Judge J. H. Richards: Whereas, the great majority of mines can not be operated without timber, and their output of ore is limited by the available timber supply; and,

Whereas, forest reserves are by law open to prospecting, locating and development of mines, as other public lands, with the single exception that large users of timber must pay a reasonable government charge therefor; and,

Whereas, the cutting and export of timber from mineral regions by large corporations constitutes a serious menace to the mining industry; and,

Whereas, the Department of Agriculture has given special attention to the question of timber supply for mining and other purposes, and is the only government department equipped to deal with all the varied, far-reaching and important problems involved in the continuous production of timber from the soil; therefore, be it

Resolved, that The American Mining Congress heartily favors the conservative use of forest resources, whether in public or private hands, and in particular the creation and management of forest reserves under practical, business-like rules and regulations to the end that local timber supplies may be maintained for mining and other uses; and,

Resolved, that the interest of the mining industry, to which timber and water are alike essential, the care and management of all government forest reserves, except as to titles, should be transferred from the General Land Office to the United States Department of Agriculture, in accordance with the recommendations of the President, the Secretary of the Interior, and the Commissioner of the General Land Office.

A MEMBER: I move that the resolution just read be adopted.

The motion was seconded, and, upon being put to a vote, was declared adopted.

### THIRD DAY—MORNING SESSION.

Thursday, August 24, 1904, 10 o'clock A. M.

PRESIDENT RICHARDS: The Congress will be in order. We have some resolutions to announce that have been reported by the Committee on Resolutions.

The Secretary read the following resolutions, together with the reports of the Committee on Resolutions thereon, to-wit:

Committee Room, August 23, 1904.

The Committee on Resolutions respectfully reports back the following resolution, designated as Resolution No. 7, introduced by Mr. T. A. Rickard, of New York, and, by unanimous vote, recommends its adoption by the Congress.

E. R. BUCKLEY, Chairman.  
J. E. TALMAGE, Secretary.

By T. A. Rickard, New York.

Whereas, this Congress earnestly desires to see the business of mining placed on a sound basis; therefore, be it

Resolved, that this Congress record its appreciation of the successful efforts of the Postoffice Department of the National Government in preventing the misuse of the mails for fraudulent mining schemes.

PRESIDENT RICHARDS: What is your pleasure with the resolution?

MR. DERN, OF UTAH: I move the adoption of the resolution as read.

The motion was seconded and carried.

The Secretary then read the report of the committee on Resolution No. 10, introduced by Mr. Cleary of Washington, and also the resolution.

PRESIDENT RICHARDS: What is your pleasure with the resolution and the recommendation of the committee that it be not adopted?

MR. CLEARY, OF WASHINGTON: Mr. President and Gentlemen: This resolution is offered in good faith. The object is this: You all know what a prospector's trials are. He is a child of Nature. His will

and his energy, naught can compare with them. When he locates a mining deposit in the wilds of Nature, the law says to him, "You shall be guided in unsurveyed land by certain objects and monuments." He acts according to that law. The land is surveyed in time. Perhaps the locator is at another place, following his lot, as you might call it. Behind him comes the parasite which ever follows every ambitious man; he finds a loophole; he can come in with agricultural scrip, timber or stone scrip, or any other kind of scrip. Inside of two months he has passed up his proof. What is that proof? Two men to declare that the land is non-mineral. You can pick that kind of people up anywhere; they know no more about mineralogy or geology than a jackass does of theology.

Now, where does the prospector come in? You know as well as anybody that he is a poor man; he carries his fortune in his pocket or on his back. He goes to the land office; it has passed up the patent. Is it not fair that the sense of that resolution should prevail, that you must put up your notices on the ground, on the trail, at the nearest postoffice, as well as at the land office? The way it is now they publish a notice in an obscure paper in an out-of-the-way column, three insertions, and your prospector is nabbed. There are 800 claims across the river here, and this whole country is wrangling over these scrip claims. Do you mean to encourage this kind of work, comrades? It only requires an amendment to our land laws. That is the sense of that resolution. I ask you to refer it back to the committee. It was my misfortune to miss being here or I should have presented the case before the committee. I ask you to refer it back to the committee.

**COLONEL CRAWFORD, OF OREGON:** Mr. President, the matter that my friend, Mr. Cleary, of Washington, spoke about, is to-day one of the most important matters before this Congress. There is too much patchwork all through this country of ours, and we miners are asserting our rights before this magnificent body of men to-day in order that we may find out where we stand and how we stand on the question of mineral deposits in the United States, that belong to the miner, and not to the adventurer, not to the schemer, not to the plasterer of a location notice, but to the hardy son of toil.

The motion to refer the resolution back to the Committee on Resolutions was seconded, and, upon being put to vote by the Chair, was declared carried.

**THE SECRETARY:** The Committee on Resolutions reports back the following resolution:

Committee Room, August 23, 1904.

The Committee on Resolutions respectfully reports back the following resolution, designated as Resolution No. 12, introduced by Mr. Steele, of Alaska, and, by unanimous vote, recommends that it be not adopted by the Congress.

E. R. BUCKLEY, Chairman.  
J. E. TALMAGE, Secretary.

#### RESOLUTION NO. 12.

J. L. Steele, Alaska.

Whereas, the District of Alaska has a population of nearly 70,000 American citizens, a large majority of whom are miners and prospectors; and,

Whereas, these pioneers have no way of obtaining redress for their grievances, except by a personal appeal to Congress; and,

Whereas, these appeals must be made to Representatives or Senators from other localities who have the welfare of their own districts and constituents to care for, and consequently these personal appeals have as yet been of no avail or benefit; and,

Whereas, it is the wish and desire of all Alaskans that they be represented in Congress of the United States by a delegate elected by the



popular vote of the people, to the end that such laws may be enacted that will be to the benefit of mining and other interests; therefore, be it

Resolved, that The American Mining Congress, in their regular convention assembled in Portland, Oregon, August, 1904, do heartily indorse this wish of Alaskans, as by so doing the great mineral storehouses of the North Land will be more speedily developed; and, be it further

Resolved, that this Congress will use every honorable means to secure to Alaska that representation our forefathers fought for at Bunker Hill; and, be it further

Resolved, that this Congress appeal to the Congress of the United States for their consideration at the next session, asking for immediate action, to the end that these hardy Americans may enjoy the privilege of representation according to the rights guaranteed in our Constitution.

PRESIDENT RICHARDS: What is your pleasure with the report of the committee?

MR. E. R. BUCKLEY, OF MISSOURI: I move you that the recommendation of the committee be adopted, and that the resolution be not concurred in by this Congress.

PRESIDENT RICHARDS: It has been moved and seconded that the report of the committee be adopted, and that this resolution be not concurred in by this body. Are you ready for this question?

MR. H. S. JOSEPH, OF UTAH: Mr. President and Members of the Congress: I think as a body representing the mining industry of the world, we are entitled to know the reason why the Committee on Resolutions is turning down these resolutions. Let them give an explanation here to the satisfaction of the Congress. That is what we are here for. The Committee on Resolutions is composed of representatives from the different delegations. At the time these resolutions are considered by the committee those interested, or those who introduced these resolutions, are allowed the privilege of presenting their claim, but you here ought to be advised of the reason why these resolutions are turned down. We want to know what is going on in the Committee on Resolutions. We don't want any star chamber proceedings; we want everything open and above board before this Congress.

MR. E. R. BUCKLEY: The Chairman of the Committee on Resolutions has been called on to make a report. I think the gentlemen of this Congress are entitled to an explanation of the position which was taken by the Committee on Resolutions with reference to this resolution. I wish to say that the Committee on Resolutions do not care to place themselves on record as opposed to Alaska having a representation in the National Congress, and it would have been better, probably, if the Committee on Resolutions had recommended that the resolution be laid on the table instead of recommending that it be not concurred in. However, the Committee on Resolutions are opposed to passing any resolution in which matters of purely a local nature, and not of national interest, are considered, and especially any resolution which affects at all the political interests of the country. This Congress, if it is to be successful, must be removed entirely and completely from politics; politics must not enter into any of the considerations or deliberations of this Congress, and the Committee on Resolutions will take this position with respect to all resolutions which are presented to them for consideration.

MR. JOSEPH T. CORNFORTH, OF ALASKA, then addressed the Congress at length, in favor of the adoption of the resolution.

MR. J. L. STEELE, OF ALASKA, then addressed the Congress at length, in favor of the adoption of the resolution.

MR. J. E. TALMAGE, OF UTAH: I agree perfectly that this Congress is entitled to know any reasons the Committee on Resolutions may have for any action that it may take; as has been so strongly demanded by my boisterous colleague from Utah. But I beg to add that the Committee on Resolutions, like your other committees, has been created, as I understand it, for the purpose of saving the valuable time of this Congress in open session, and that notices have been posted of these resolutions and a copy of each resolution announcing the time at which the committee would consider it, and inviting all who were interested to come there and present their reasons in its favor. The Committee on Resolutions have reported this back with the recommendation that it be not adopted, not because they are not in sympathy with Alaska, but for the simple reason that it is their conviction that they have no jurisdiction of the matter.

Mr. Talmage addressed the Congress somewhat at length, explaining that it was not the province of the Mining Congress to pass on the status of States and Territories and districts with reference to representation in Congress.

MR. IRWIN MAHON, OF PENNSYLVANIA, then addressed the Congress, in favor of the resolution.

MR. STEELE, OF ALASKA: I want to move a substitute. I move you, sir, that the report of the Committee on Resolutions be not concurred in, and that the resolution be adopted by this Congress.

MR. H. S. JOSEPH, OF UTAH: I second the motion.

PRESIDENT RICHARDS: It is moved and seconded that a substitute be adopted, that the report of the committee be not concurred in, and that the resolution be adopted as read. Under the rules of this body the chairman of the committee has the right to close the debate.

MR. E. R. BUCKLEY, OF MISSOURI: Gentlemen of the Congress: I have listened with a great deal of interest to the remarks of the gentleman from Alaska, and from our Honorable Secretary. I think that each member of this committee appreciates the position which is maintained by the gentlemen from Alaska. We understand the magnificent resources of Alaska, and, as individuals, we would do anything within our power to further the interests of Alaska. But you come before our committee asking us to pass favorably upon resolutions coming to us from every part of the United States, which are local in their nature, which are political in their nature, and which subordinate the one great object of this Mining Congress—the establishment of a Department of Mines and Mining. You ask us, gentlemen, to curtail our influence with the National Government for the establishment of that department, by passing not one, but fifteen or twenty resolutions directed to that National Congress pertaining to matters which are of local, and not national importance. I say to these gentlemen that as long as this committee, which you have appointed to pass upon these resolutions, is in session, no resolution will be recommended which may in any way lessen our influence in the establishment of a Department of Mines and Mining.

Gentlemen, I wish to say that this committee is in session every morning at 8 o'clock; it is in session until the Congress is convened in the morning; it is in session at noon, and it is in session after the afternoon session is completed, and that any member of this Congress interested in any resolution which comes before that committee, may have a hearing before that committee. We have posted the resolution on the bulletin board; we have given notice when those resolutions are to be considered, and that is the place and the time for the members who are interested in those resolutions to appear and present their arguments in favor of or against such resolutions. Gentlemen, I claim that it is wrong for members to ignore the opportunity to appear before that committee and



speaking in behalf of resolutions, and then come before this Congress in session and take its time, especially in matters which do not pertain to or come under the jurisdiction of this body. If the gentlemen from Alaska desire a hearing upon this resolution, we would be glad to take that resolution back and give them another opportunity to be heard; we would be glad to reconsider that resolution; but I wish to give the members of this Congress warning, at this time, that other resolutions which are presented to that committee and returned unfavorably will not be taken back, if you neglect the opportunity to be heard before that committee.

Gentlemen, this committee demands the respect of this Congress. The actions of this committee can not be ignored by this Congress. You cannot remain at your hotels in the morning until 10 o'clock while that committee is in session, and, when a resolution is adversely reported, pass these resolutions over the heads of that committee. If you want a hearing before that committee you have the privilege. This committee is not a close corporation; it is a committee appointed by this Congress, and we stand ready to hear every argument that any man in this Congress desires to make with respect to any resolution which comes before it.

A member of the Congress arose.

**PRESIDENT RICHARDS:** The debate is closed. The Chair announced that the Chairman of the Committee on Resolutions had a right under the resolution to close the debate. The question now is on the substitute.

**MR. DITTMAR, OF CALIFORNIA:** I should think, under the circumstances, other remarks are in order.

**PRESIDENT RICHARDS:** That is all right, but it gives the Chairman of the Committee the right to close again.

**SEVERAL MEMBERS:** Let him close again.

**MR. DITTMAR:** Mr. President and Fellow Delegates: I have listened to the arguments advanced here by the members of the committee, and also the delegates from Alaska and their friends, and it seems to me that this is not a question merely of considering the wishes of a committee, but should first, last and always be a question of considering the necessities of a great and important section of the mining industry of the American nation.

While I agree with my friends of the committee in the argument that they advance, that it is right and proper for any one who presents a resolution to appear before that committee and there present what they desire to say, yet they certainly should have the opportunity thereafter, if that committee should report adversely, to appear upon the floor of this Congress and ask the delegates to pass their judgment upon it in a session at large. That is a right and a rule recognized in all assemblages. I have never seen an attempt made to delegate to a few men the rights of an entire body.

My friends, so far as Alaska is concerned, in asking for a representative in the National Congress, Alaska is not going outside of the rights of this Congress in asking for its endorsement. If this Congress has the right to recommend anything, or to express its opinion on any subject, it has a right to express its opinion on the subject at present under consideration, and while I do not wish to suggest that this body act over the heads of the committee, as it has been expressed, I believe that the Committee on Resolutions, when it gives sober reflection to the question at issue, will agree, that certainly the body which has created it is greater than the body it has created. I wish, my friends, in closing these few remarks on this line, to second the motion which was made by the gentleman from Alaska—I do not believe that motion has been seconded—to pass the resolution, and if the Committee on Resolutions wishes to



reconsider and report the resolution and let the body act without a recommendation, I am willing, out of consideration for the committee, to make that as an amendment, or to stand for an amendment of that character, and I believe that is the best thing for the committee to do, because the resolution will most assuredly pass.

**COLONEL CRAWFORD, OF OREGON:** Taking the stand of a common miner, Mr. President, I do not know much about parliamentary rules and regulations. But our boys from Alaska wandered up there when William Henry Seward bought Alaska, and when men in Washington said, "My Lord! what are they buying Alaska for, for an ice house for the United States?" I heard that when I was a young man on the streets of Washington. Yet Alaska has paid more into the government treasury than any other State we have purchased. We have a band of miners up there who are struggling for representation. Without haggling about this thing or that thing, let us as miners of the United States of America endorse the request of our boys from Alaska, and do it with a will. That is all I've got to say.

**MR. JONES, OF ALASKA:** Gentlemen of the Convention: I do not believe for a minute that there is any delegate here that wishes to treat the Committee on Resolutions with discourtesy, but you have heard their explanation, that there has been little, if any, appearance on the part of the movers of resolutions before that committee. They have also expressed to you that they are in hearty accord with the principles set forth by the mover of the resolution, but believing that it was not germane to the questions for which this Congress has convened, they have seen fit to recommend and, perhaps unfortunately, in the language thereof, that it be not granted. Now, as a matter of justice and in the interest of harmony, I think if the Chair could entertain a motion to recommit at this time—I don't know whether it would be in order—that thereby it would remove what now appears to be an action on the part of this Congress which is very discourteous to their Committee on Resolutions, who have been doing really the work of this Congress.

**SEVERAL MEMBERS:** No, no.

**MR. JONES OF ALASKA:** You have all disapproved of one of the recommendations of the Committee on Resolutions; this is the second this morning for your consideration and there may be a great many others. Are we not establishing a precedent that would practically mean that you do not care for the further services of your Committee on Resolutions? They are certainly worthy of some consideration from this Congress, and I believe that the committee can word its report so as to remove the seeming appearance of being adverse to the resolution, and if the Chair will entertain the motion, I would move that it be re-committed to the Committee on Resolutions.

The motion was seconded.

**PRESIDENT RICHARDS:** It is moved and seconded that this report be re-committed to the Committee on Resolutions for further consideration.

**MR. M. D. LEEHEY OF WASHINGTON:** Mr. President, as a member of the Committee on Resolutions and as an ardent advocate of the proposition of a delegate from Alaska, I am opposed to the motion made by my colleague, Mr. Jones.

The Committee on Resolutions have been compelled to take this stand that the purpose of this resolution was foreign to the Congress. They have taken that stand. Now, it will do no good to refer that to the Committee on Resolutions, because I am satisfied that every member of that committee is in favor of this motion, if it were within the purview of this Congress. If this Congress sees fit to pass this motion of

Mr. Steele of Alaska, and not concur in the report of the Committee on Resolutions, you will thereby say as a Congress that it is within the purview of its work, and you will relieve the committee from further responsibility. (A Voice: Yes, that is right.) Mr. President, I am opposed to the motion of Mr. Jones and prefer to have the vote taken on the motion of Mr. Steele.

**THE PRESIDENT:** The question is on the motion to re-commit this resolution to the Committee on Resolutions. Are you ready for the question? (Putting the question.) The "noes" have it. It is lost. The question now recurs on the substitute, that is, that the report of the committee be not concurred in and that the resolution be adopted as read. (Putting the question.) The "ayes" have it and the resolution is adopted.

The Secretary read a resolution offered by Mr. T. A. Rickard of New York that El Paso be selected as the place for holding the annual session of 1905, and it was referred to the Committee on Resolutions. Said resolution is set out in full in a subsequent session, with the report of the committee.

The Secretary also read the following resolution by A. L. Morris:

Whereas, Much of the money lost in mining stocks and investments by those who are not acquainted with the workings of the mines is due to the fictitious reports made by many who are not qualified to make such reports; and,

Whereas, There are no laws governing the qualification of the mining engineers of the country; now, therefore, be it

Resolved, That the legislatures of the mining states be urged to enact such laws governing the licensing and qualifications of such as are deemed best in their own judgment, making the basis the same as on examinations for lawyers, doctors or other professional occupations.

**PRESIDENT RICHARDS:** The resolution will be referred to the committee.

**MR. JOSEPH OF UTAH:** Mr. President, having presented a resolution, I have been the recipient of many courtesies from the Committee on Resolutions. I have been before them and they have given me a respectful hearing; but I do take umbrage at the remarks of the honorable secretary of that committee in referring to the "very boisterous member from Utah." I only wish other members in this Congress were as boisterous.

I have a resolution here that should go with Resolution No. 5, and I ask a hearing at the same time.

(Mr. Joseph then read his resolution, which in a somewhat modified form, appears on page 49 of these proceedings, with the committee's report. Continuing his remarks, he said):

In order that the Congress may be enlightened upon this subject (as there are few of us who know that such a law has been passed), I will read the law; the bill passed by Congress at its last session and signed by the President February 28, 1904, reads as follows:

"Section 2327. The description of vein or ledge claims upon surveyed lands shall designate the location of the claims with reference to the lines of the public survey, but need not conform therewith; but where patents have been issued for claims upon unsurveyed lands, the surveyor-general, in extending the public survey, shall adjust the same to the boundaries of patented claims so as in no case to interfere with or change the true location of such claims as they are officially established upon the ground. Where patents have issued for mineral lands, those lands only shall be segregated and shall be deemed to be patented which are bounded by the lines actually marked, defined and established upon the ground by the monuments of the official survey upon which the patent grant is based, and the surveyor-general in executing subsequent patents surveys,



whether upon surveyed or unsurveyed lands, shall be governed accordingly. The said monuments shall at all times constitute the highest authority as to what is patented, and in case of any conflict between the said monuments of such patented claims and the description of said claims in the patents issued therefor, the monuments on the ground shall govern, and erroneous or inconsistent descriptions or calls in the patent description shall give way thereto."

In conjunction with this, the Department of the Interior has sent out the following letter to surveyor-generals, who in turn have sent them to deputy United States mineral surveyors, and I believe that all mineral claimants are so much interested in this question as to justify me in reading it:

DEPARTMENT OF THE INTERIOR, WASHINGTON,  
August 8, 1904.

The Commissioner of the General Land Office:

Sir—The Department is in receipt of a communication from your office, dated July 19, 1904, submitting for consideration here draft of proposed amendment of paragraph 147 of the official mining regulations. The Department has deemed it necessary to make certain changes in the draft submitted; and the paragraph in question, amended to read as follows, is hereby approved:

"147. If an official mineral survey has been made in the vicinity, within a reasonable distance, a further connecting line should be run to some corner thereof; and in like manner all conflicting surveys and locations should be so connected, and the corner with which connection is made in each case described. Such connections will be made and conflicts shown according to the boundaries of the neighboring or conflicting claims as each is marked, defined, and actually established upon the ground. The mineral surveyor will fully and specifically state in his return how and by what visible evidences he was able to identify on the ground the several conflicting surveys and those which appear according to their returned tie or boundary lines to conflict, if they were so identified, and report errors or discrepancies found by him in any such surveys. In the survey of contiguous claims which constitute a consolidated group, where corners are common, bearings should be mentioned but once."

In this connection, it may be remarked that a mineral patent is with the record in a mining case on appeal here, in which but one monument, stated therein to be situated at corner No. 1 of the claim there in question, is found to be mentioned, notwithstanding four monuments are referred to and described in the report of the deputy mineral surveyor accompanying the approved survey of the claim, as marking the four corners of the claim upon the ground. It has also been informally reported to the department that the practice has prevailed in your office, to a greater or less extent, of issuing mineral patents in which no mention whatever is made of any of the monuments reported and described by the deputy mineral surveyors.

Your attention is directed to the requirements under section 2325, Revised Statutes, that an applicant for mineral patent shall file with his application a plat and field notes of the claim or claims in common, made by or under the direction of the United States Surveyor General, showing accurately the boundaries of the claim or claims, which shall be distinctly marked by monuments on the ground, and that within sixty days' period of publication he shall file a certificate of the surveyor general that the plat is correct, with such further description by such reference to natural objects or permanent monuments as shall identify the claim, and furnish an accurate description, **to be incorporated in the patent.**

In view of the foregoing and of the provisions of the mining regulation pursuant thereto, it is to be observed that the practice referred to is unauthorized and unwarranted. Hereafter, your office will be careful to include in every mineral patent an adequate and accurate description



of each of the monuments reported in connection with the survey of the claim for which the patent is to issue, and to state at the appropriate point in the instrument the particular corner reported to be marked or witnessed on the ground by each monument, and will also include therein such additional bearings as may be reported in connection with any such monuments, description of reported points of intersection with other approved surveys, and, generally, all data with respect to the designation of the actual locus of the claim prescribed under or in connection with paragraphs 34, 36, 38, 48, 143, 144, 145, 146 and 154 of the mining regulations, as far as set forth in the report of the mineral surveyor. This requirement will apply to all mineral patents not yet issued from your office. In any case in which the report of a deputy mineral surveyor should contain no mention and description of monuments as defining the boundaries of a claim upon the ground, patent will be withheld until the claim shall be shown to have been so defined, as required by the law and official regulations, and the monuments are particularly described in a supplemental report, duly approved by the surveyor general.

Very respectfully,

(Signed)

THOS. RYAN, Acting Secretary.

A MEMBER: What is that resolution aimed at?

MR. H. S. JOSEPH, OF UTAH: The resolution is aimed at an amendment to this law, so that in case the monuments are not found upon the ground or cannot be identified, the records will then hold. That is the object of the resolution.

The resolution was referred to the committee.

Mr. R. C. Patterson, of Nebraska, offered a resolution of thanks to the President of the United States for his interest in mining and allied industries, which was referred to the Committee on Resolutions, and substitute favorably reported, which is set out in the proceedings of the afternoon session of the 24th.

MR. E. R. BUCKLEY, OF MISSOURI: Let me take just a moment of your time and offer one suggestion to the members of this Congress, and that is that they devote just a little more time to the wording of the resolutions as presented to this Congress, and that they make them perfectly clear. I know from personal knowledge that a considerable number of resolutions presented to this committee were thought of, say in the morning, written within a half hour of the time the idea occurred to the individual, and then presented to this Congress. I think the fact that Mr. Joseph has modified his first resolution by reporting another is evidence of the fact that resolutions should be given more careful consideration by the members before being presented.

MR. J. A. ABBOTT, OF COLORADO: Mr. President: After consultation with a number of the representative members of this Mining Congress and delegates here present, I have been requested to make, and do now make, a motion that you appoint a committee of three to make a list for submission to this Congress of nine members, who shall serve on the Executive Committee of this Congress for the ensuing year; that you appoint a committee of three to carefully prepare a list of nominations of nine executive officers to serve for the ensuing year.

PRESIDENT RICHARDS: You make that as a motion?

MR. ABBOTT: I make it as a motion.  
The motion was seconded.

PRESIDENT RICHARDS: It is moved and seconded that the Chair appoint a committee of three to present to this Congress nine names for nomination as members of the Executive Committee for the coming year. (Putting the question.) Carried.

I am requested to announce that by the official call of the fifteenth annual session of the Trans-Mississippi Commercial Congress, it will be convened in St. Louis on October 25th, and the notice thereof will be posted on the bulletin board here.

**PRESIDENT RICHARDS:** The chairman of the Credentials Committee desires that all delegates and members file their credentials with the Secretary so that the Chairman may report on those entitled to vote at this Congress at the incoming of the afternoon session.

What is your further pleasure? We will take up the program. Dr. Buckley was first on the program, but, as Colonel Crawford of Oregon will be compelled to leave to-day, Dr. Buckley has kindly consented that Colonel Crawford occupy his time.

**COL. J. S. CRAWFORD, OF OREGON,** then read a paper on "Electricity, Its Forces and Conditions, as Found in Geology."

### THIRD DAY—AFTERNOON SESSION.

August 24, 1904, 3 P. M.

**PRESIDENT RICHARDS:** The Secretary has some announcements to make.

**SECRETARY MAHON:** I wish to inform the Congress that our President, in the name of the Congress, sent forward yesterday evening the following dispatch:

Mr. M. H. Lattimer, Seattle:

The seventh annual assembly of the American Mining Congress, now in session in Portland, learns with much satisfaction that the cable connecting Portland, Seattle, and Alaska has just been completed, and desires to extend through you their congratulations to the proper authorities on the success of so great and wise an enterprise.

J. H. RICHARDS, President.

To this message the following answer has just been received:  
J. H. Richards, President of the Mining Congress, Portland, Oregon.

People of Seattle thank you and the American Mining Congress for kind message on connecting Alaska cable.

SEATTLE CHAMBER OF COMMERCE,

JOHN SCHRAM, President.

I have the following resolution to report:

Committee Room, August 24, 1904.

The Committee on Resolutions respectfully reports back the following resolution, designated as Resolution No. 14, introduced by Mr. Rickard, of New York, and without recommendation.

E. R. BUCKLEY, Chairman.

J. E. TALMAGE, Secretary.

### RESOLUTION NO. 14.

T. A. Rickard, of New York.

Whereas, it is believed that much good must accrue to the Congress by holding a session on the Mexican border; and,

Whereas, the Texas delegation has guaranteed an enthusiastic reception on the part of their people; and,

Whereas, El Paso has offered this body liberal support; therefore, be it

Resolved, that this Congress recommends to the Board of Directors the selection of El Paso as the city in which to hold the annual session for 1905.

PRESIDENT RICHARDS: What is your pleasure with the resolution which is reported back without recommendation?

MR. COBB, OF TEXAS, then addressed the Congress in favor of the adoption of the resolution.

PRESIDENT RICHARDS: What is your pleasure with the resolution?

MR. GARRIGUS, OF OREGON:: I move the adoption of the resolution as read.

The motion was duly seconded, and upon being put to a vote, was unanimously carried, and the resolution adopted.

PRESIDENT RICHARDS: At this morning session Mr. Abbott made a motion that the Chair appoint a committee of three to nominate candidates for directors of this Congress during the ensuing year. In order to make that committee harmonious and fitting, it seems to me that it should consist of five. If there is no objection to making it five instead of three, I am ready to announce that committee.

MR. ABBOTT, OF COLORADO: I accept that suggestion, Mr. President.

PRESIDENT RICHARDS: I have appointed the following as that committee:

Col. Thomas Ewing, of California; Geo. W. E. Dorsey, of Nebraska; J. F. Callbreath, of Colorado; M. P. Gilbert, of Utah; Zach Lamar Cobb, of Texas.

MR. DERN, OF UTAH: I think you credited to Utah one who is not a delegate from Utah. Mr. Gilbert is a delegate from Los Angeles.

PRESIDENT RICHARDS: That was an oversight. I will appoint John Dern, of Utah.

We have on our program this afternoon, first, an address by Dr. E. R. Buckley, of Missouri, on "Functions of the State Geological Survey and Bureau of Geology and Mines."

Mr. Buckley then gave a short address on the subject announced.

PRESIDENT RICHARDS: We will now be favored with an address by Col. John Daggett, of California, on the "Mineral Resources of California."

Address will be found in Part II.

PRESIDENT RICHARDS: The Secretary will make an announcement.

SECRETARY MAHON: If all delegates who desire to attend the theater this evening, with their friends, will come to the stage, we will supply them with tickets.

MR. DITTMAR, OF CALIFORNIA: I wish to inquire if there is a program for this evening?

PRESIDENT RICHARDS: A reception at the Commercial Club this evening.

MR. JOSEPH, OF UTAH: Mr. President: You will recollect the special order at 10 o'clock to-morrow morning is the taking up of the report of the Committee on Credentials.

Upon motion, duly seconded, the Congress adjourned until 10 o'clock A. M., August 25, 1904.



## FOURTH DAY—MORNING SESSION.

August 25, 10 A. M.

The Congress was called to order by the President.

Read by title: "The Mining Resources of South Carolina," by E. J. Watson.

This address is included in Part II. of this report:

Secretary Mahon read the following report of the Committee on Resolutions:

Committee Room, August 24, 1904.

The Committee on Resolutions respectfully reports back the following resolution, designated as Resolution No. 15, substitute introduced by Mr. Patterson, of Nebraska, and, by unanimous vote, recommends its adoption by the Congress.

E. R. BUCKLEY, Chairman.

J. E. TALMAGE, Secretary.

## RESOLUTION NO. 15.

By Mr. Patterson, of Nebraska.

Be it resolved, that the thanks of this Congress be and are hereby tendered to the President of the United States for the interest he has taken in the works of the Congress as evidenced by the appointment of delegates to represent the government in our deliberation and for assigning Professor Newell of the Reclamation Service and Professor Pinchot of the Bureau of Forest Reserve to address this Congress.

PRESIDENT RICHARDS: What is your pleasure with the resolution?

It was moved and seconded that the resolution as read be adopted. Carried.

The Secretary announced Resolution No. 9, substitute, introduced by James G. Giben, of Washington, returned by committee with recommendation that it "be forwarded to Mr. Newell, of the Land Commission, created by the President of the United States."

PRESIDENT RICHARDS: What is your pleasure with the resolution?

MR. BUCKLEY, OF MISSOURI: I move the adoption of the substitute resolution as recommended by the committee.

The motion was seconded.

MR. STEELE, OF ALASKA: Mr. President: Would it be in order to ask the Secretary to read the last clause of that resolution again? (It was read as requested.) Mr. President: I can not understand what that means when it says, "Not more than two claims in each district." If that applies to Alaska, we would have to apply it to the judicial districts or to the commissioner's districts; and some of our districts are larger than States; and if it means that not more than two claims can be located in each of those districts, it seems to me it would work a hardship. If I am not right in its interpretation, I want to be put right.

PRESIDENT RICHARDS: That is the way it reads.

MR. STEELE: Then I would move to amend that resolution by making it "not more than two placer claims on any one creek."

PRESIDENT RICHARDS: Would it not be better to have it referred back to the committee and have the proper amendment made there?

The motion was seconded.

MR. BUCKLEY: I wish to explain that this resolution was referred to two gentlemen on the committee who were specially familiar with that subject. Personally I have no familiarity with placer mining, and I would be very glad to have that resolution come back to the committee.

**PRESIDENT RICHARDS:** If there is no objection, then, the Chair will refer it back to the committee.

The Secretary announced the following resolution as having been returned by the Committee on Resolutions, with recommendation, to-wit:

Committee Room, August 24, 1904.

The Committee on Resolutions respectfully reports back the accompanying resolution, designated as Resolution No. 10, introduced by Mr. Cleary, of Washington, and recommends that said resolution be forwarded to Mr. Newell, of the Land Commission, created by the President of the United States; said commission having as its specific duty the recommendation of modifications of the present laws governing the public domain.

E. R. BUCKLEY, Chairman.

J. E. TALMAGE, Secretary.

#### RESOLUTION NO. 10.

John M. Cleary, Washington.

Be it resolved, that in any mineral zone where a mining right exists, all conflicting right to patent, agricultural or scrip, shall go through same procedure as application for final mineral proof and patent, full compliance as to notices, press and postoffices and highways and grounds.

The prospector is handicapped and his rights are defeated by the present methods of final proof.

**PRESIDENT RICHARDS:** What is your pleasure with the resolution?

It was moved and seconded that the report of the committee be adopted. Carried.

Secretary Mahon read the following resolution, with the report of the committee thereon:

Committee Room, August 24, 1904.

The Committee on Resolutions respectfully reports back the accompanying resolution, designated as Resolution No. 16B, said No. 16B being a substitute for No. 16, and this in turn a substitute for No. 5, introduced by Mr. Joseph, of Utah, and recommends that said resolution be forwarded to Mr. Newell, of the Land Commission, created by the President of the United States, said Commission having as its specific duty the recommendation of modifications of the present laws governing the public domain.

E. R. BUCKLEY, Chairman.

J. E. TALMAGE, Secretary.

Papers accompanying the resolutions and substitutes are returned herewith.

#### RESOLUTION NO. 16 "B."

By H. S. Josephs, of Utah.

Whereas, according to Section 2327, of Revised Statutes of the United States, passed by Congress at its last session and signed by the President February 8, 1904, no provision is made whereby a claim can go to patent in the absence of monument after the survey thereof is approved; and,

Whereas, by reason of such omission in the law, the mineral claimants throughout the United States will be put to a needless and vast expense; therefore, be it

Resolved, by the American Mining Congress in convention assembled August, 1904, that a recommendation be made to the Land Commission appointed by the President of the United States, that it may recommend in turn an amendment to said Section 2327, providing that in the loss or absence of monuments from mining claims, the Surveyor General's record of such survey shall govern and constitute the highest authority.

(The "papers accompanying the resolutions" are set out in Mr. Josephs' original discussion when offering the resolution, on page 42.

PRESIDENT RICHARDS: What is your pleasure with the report and resolution?

It was moved and seconded that the report of the committee be adopted. Carried.

Secretary Mahon read Resolution No. 8, with the report of the Committee on Resolutions thereon.

Committee Room, August 24, 1904.

The Committee on Resolutions respectfully reports back the following resolution, designated as Resolution No. 8, introduced by Mr. Drake, of Oregon, and, by unanimous vote, recommends its adoption by the Congress.

E. R. BUCKLEY, Chairman.

J. E. TALMAGE, Secretary.

#### RESOLUTION NO. 8.

Whereas, the establishment of assay offices, selected with great care, so as to best accommodate the great mining districts in the different sections of the United States, are great aids in the development of the mining industry of America; therefore,

Resolved, that this Congress recommends to the Congress of the United States the establishment of such assay offices at appropriate locations in different sections of the United States, the locations of which to be selected with great care; and,

Whereas, at the last session of Congress, Senate Bill No. 280, entitled "A bill to establish an Assay Office at Portland, Oregon," was reported unanimously from the Senate Committee on Finance, and passed the Senate without a dissenting vote, and which bill is now pending before the Committee on Coinage, Weights and Measures of the National House of Representatives; and,

Whereas, the State of Oregon is rapidly developing into one of the richest mineral States in the Union, having, according to the report of the Geological Survey, produced between the years 1862 and 1902, gold and silver of the aggregate value of \$115,000,000; and,

Whereas, the State is divided into three great mineral districts, namely, Eastern Oregon, Middle or Central Oregon, and Southern Oregon; and,

Whereas, the nearest assay office to any portion of these vast mineral districts is Boise, Idaho, on the east, Seattle, Washington, on the north, and San Francisco, California, on the south; and,

Whereas, it is, in the judgment of this Congress, important in the interest of the general development of the mineral industry of the United States that an assay office should be established at the City of Portland, in the State of Oregon; therefore, be it further

Resolved, that this Congress favors the passage of said bill through the National House of Representatives at the next session of Congress, and earnestly appeals to the House Committee on Coinage, Weights and Measures, and to the National House of Representatives, to give said bill favorable consideration at its next session.

PRESIDENT RICHARDS: What is your pleasure with the resolution?

It was moved and seconded that it be adopted. Carried.

The Secretary then read letters from Dr. J. A. Holmes, of St. Louis, Missouri, and J. J. Guentherodt, of Nevada City, California.

MR. DODGE, OF OREGON: Mr. President, before the Congress takes up the regular order of business I wish, in behalf of the members and delegates who attended the pleasant reception at the Commercial Club last evening, to offer a resolution and move its adoption. I will ask the secretary to read it.

The Secretary read the resolution.



MR. JOSEPHS, OF UTAH: Mr. President: I also have a resolution, which I wish to read, and move its adoption.

The resolution was read.

MR. PATTERSON, OF OMAHA: I move that the rules be suspended, and the resolution as read be adopted by a rising vote.

MR. JOSEPHS: I second the motion.

MR. BUCKLEY (the motion having been put by the Chair): I simply wish you to say that the Resolutions Committee this morning appointed a sub-committee to draft resolutions of thanks covering the entire convention, and it has started to prepare such a resolution. If these were referred to that committee they would be embodied in that general resolution. I am not opposed to these resolutions, but would be glad to have them referred to this sub-committee.

MR. DODGE: I move that they be referred to that committee.

PRESIDENT RICHARDS: They will be so referred.

MR. DERN, OF UTAH: Mr. President: I wish to offer the following resolution:

#### RESOLUTION.

Portland, Oregon, August 25, 1904.

By John Dern, Salt Lake City, Utah.

Whereas, the Hon. Geo. H. Williams, Mayor of the City of Portland, extended to the American Mining Congress the use of two handsome rooms in the City Hall, as headquarters for this organization from March, 1904, to August 31, 1904, free of all cost, and was in every other way most courteous in his treatment of our Secretary; therefore, be it

Resolved, that The American Mining Congress, appreciating this most courteous treatment, do now extend to His Honor, Mayor Williams, a most hearty and sincere vote of thanks.

MR. JOSEPHS: I move that the resolution be referred to the proper committee.

MR. DRAKE, OF OREGON: Mr. President: The Mayor of Portland has been very considerate and very helpful; he is a distinguished man, and much admired and loved by all who know him, by all the citizens of Portland. We are under special obligations to him, and I would like to honor him by having this resolution not embodied in any other; and I would ask that the rules be suspended, and this resolution adopted by a rising vote.

The resolution was adopted unanimously by a rising vote.

PRESIDENT RICHARDS: The first thing on our program this morning is in relation to the Thunder Mountain district, of Idaho. Many inquiries have been made in regard to it, and Mr. Borthwick has kindly consented to give you a short address upon that unknown region.

Mr. A. E. Borthwick then addressed the Congress upon "Idaho and Thunder Mountain."

This paper will be found in Part II. of this report.

To the President and Members of the American Mining Congress.

Gentlemen: Your Committee duly appointed on the Credentials of Members to this Congress, beg to report that they have found six hundred and ninety-six accredited and appointed delegates to this Congress, and three hundred and seven permanent members, making a grand total of one thousand and three (1,003) who are legally entitled to be present and participate in the proceedings of the Seventh Annual Session of the Congress.

PHILIP S. BATES, Chairman.

R. C. PATTERSON.

M. P. GILBERT.

The following is the complete list of delegates present at this time of which we have any knowledge:—

## AT LARGE.

Gayley, James.....	New York
Hammond, John Hays.....	New York
Rickard, T. A.....	New York
Mudd, S. W.....	Los Angeles
Emmons, S. F.....	(United States Geological Survey)
Hayes, C. W.....	(United States Geological Survey)
Ransome, F. L.....	(United States Geological Survey)
Diller, J. S.....	(United States Geological Survey)

## ARIZONA.

Ewing, Col. Thomas.....	Vivian
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## ALASKA.

Leehey, Maurice D.....	Ketchikan
Lovell, Sam. L.....	Catalla

## BRITISH COLUMBIA.

Sutton, W. J.....	Victoria
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## CALIFORNIA.

Halloran, Arthur H.....	San Francisco
Dittmar, M. E.....	Redding
Brokaw, A. C.....	Redding
Scott, J. B.....	Redding
Merton, T. D.....	San Francisco
Gunn, Charles M.....	San Francisco
Daggett, John.....	Redding

## COLORADO.

Wilson, William L.....	Denver
Abbott, James W.....	Denver
Hamlin, Clarence C.....	Colorado Springs
Bridgeman, W. E.....	Denver
Crane, Dr. F. J.....	Denver
Callbreath, James F., Jr.....	Denver

## IDAHO.

Miller, W. C.....	Wallace
Hutton, L. W.....	Wallace
Greenough, Thomas L.....	Mullen
Cowen, E. P.....	Mountain Home
Dewey, E. H.....	Nampa
Seigwin, John.....	Mineral

## IOWA.

Berry, J. W.....	
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## MAINE.

Small, Col. J. T.....	Lewiston
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## MISSOURI.

Cook, J. H.....	Joplin
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## MONTANA.

Stannard, Geo. F.....	Kalispel
Clark, H. S.....	Butte
Wood, David.....	Great Falls

## NEBRASKA.

Nicholson, H. H.....	Lincoln
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## NEVADA.

Pearson, S. T.....

## NORTH CAROLINA.

Gallusha, Robert.....Marble

## OREGON.

Voorheis, A. E.....Grant's Pass  
 Coe, R. L.....Grant's Pass  
 Gilkey, H. L.....Grant's Pass  
 Johnson, C. L.....Salem  
 Roat, W. B.....Cottage Grove  
 Higgins, C. C.....Grant's Pass  
 Kimbrae, G. W.....Roseburg  
 Metzker, C. O.....Lakeview  
 Olston, Otto.....Eugene  
 Fisher, Geo.....Eugene  
 Armitage, B. M.....Myrtle Creek  
 Ingham, E. H.....Eugene  
 Phillips, F. B.....Cottage Grove  
 Fisk, J. H.....Portland  
 Jones, J. J.....Cottage Grove  
 Wheeler, F. B.....Cottage Grove  
 Campbell, P. L.....Eugene  
 Pointexter, C. W.....Grant's Pass  
 Warner, G. G.....Cottage Grove  
 Hyde, J. M.....Eugene  
 Smith, T. C.....Salem  
 Lundberg, Alex.....Bohemia  
 Zimmerman, L.....Portland  
 Merrill, E. S.....Blue River  
 Shane, W. H.....Bohemia  
 Nutzker, C. O.....Lakeview  
 LeRoy, A. D.....Bohemia  
 Fletcher, J. D.....Medford  
 Hansen, Otto.....Salem  
 Wickersham, L. G.....Grant's Pass  
 Campbell, Thomas K.....Cottage Grove  
 Waggoner, George E.....Blue River  
 Wood, A. B.....Cottage Grove  
 Whitman, J. A.....Medford  
 Conklin, Arthur.....Grant's Pass  
 Blockberger, F. R.....McMinnville  
 Kemp, L. A.....Roseburg  
 Walker, A. W.....Eugene  
 Cannon, E.....Portland  
 Start, S. S.....Sumpter  
 Brady, P. A.....Sumpter  
 Eselstyn, J. N.....Sumpter  
 Nicholson, H. H.....Sumpter  
 Mohr, Anthony.....Sumpter  
 Bellman, L. R.....Sumpter  
 Hammond, I. B.....Portland  
 Houston, W. A.....Baker City  
 Hand, Frank J.....Portland  
 Oglesby, W. W.....Cottage Grove  
 Garrigus, L. C.....Portland  
 Selig, N.....Myrtle Creek  
 Pape, J. B.....Cottage Grove  
 Kaufman, I. S.....Marshfield  
 Hennsey, P.....Marshfield  
 Chandler, W. S.....Marshfield



Jordan, F.....	Cottage Grove
Mitchell, McKinley.....	Gervais
Kramer, Willis.....	Myrtle Creek
Dennis, W. B.....	Black Butte

## ONTARIO (Canada).

Macquene, Lieut. Col. Frederick N.....	Woodstock
Haance, Eugene.....	Ottawa
Barlow, Alfred E.....	Ottawa

## SOUTH DAKOTA.

O'Hara, C. C.....	Rapid City
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## TEXAS.

Winn, W. H.....	El Paso
Waldo, Gentry.....	El Paso
Norman, Harry.....	El Paso
Malcomson, James W.....	El Paso
Morris, M. E.....	El Paso
Kirk, M. P.....	El Paso
Land, Otto.....	El Paso
Gifford, A. W.....	El Paso
Krakauer, A.....	El Paso
Fisher, J. W.....	El Paso
Campbell, J. H.....	El Paso
Pitman, Park W.....	El Paso
Kelly, C. E.....	El Paso
Cobb, Zach Lamar.....	El Paso

## UTAH.

Kirby, John A.....	Park City
Tibbals, William H.....	Salt Lake
Powers, Oreando W.....	Salt Lake
Dern, John.....	Salt Lake
Talmage, James E.....	Salt Lake
McKay, A. N.....	Salt Lake
Byrne, C. T.....	Salt Lake
Jennings, James E.....	Salt Lake
Child, William H.....	Salt Lake
Lawrence, H. C.....	Salt Lake
Morrison, S. W.....	Salt Lake
Tulloch, S. W.....	Salt Lake
Chipman, James.....	Salt Lake
Joseph, H. S.....	Salt Lake
Davis, A. J.....	Salt Lake
Martin, L. D.....	Salt Lake
King, J. C. E.....	Salt Lake
Jacobs, Tony.....	Salt Lake
Whitney, Race.....	Salt Lake
White, Geo.....	Salt Lake
Haleman, G. P.....	Salt Lake
Houston, J. W.....	Salt Lake
Peterson, O. T.....	Salt Lake
Halloran, W. J.....	Salt Lake
Cannon, R. D.....	Salt Lake
Egan, T.....	Salt Lake
Hudson, C. E.....	Salt Lake
Eccles, David.....	Ogden
Rolopp, H. H.....	Ogden
Dee, Thomas D.....	Ogden

## WASHINGTON.

Girens, James G.....	Seattle
McManns, James E.....	Seattle
Earnest, A. B.....	Seattle
Jones, J. D.....	Seattle
Cornforth, J. T.....	Seattle
Harper, F. C.....	Seattle
Rodda, R. W.....	Seattle
Daniels, Thurston.....	Vancouver
Merchant, William F.....	Walla Walla
Barron, L. G.....	Walla Walla
Steel, William A.....	Seattle
McClaine, A. F.....	Tacoma
Mather, John.....	Seattle
McIntyre, A. W.....	Everett
Knox, Frank.....	Little Rock
Lange, R. C.....	Chehalis
Kotick, Frank.....	Olympia
Adams, W. H.....	Olympia
Braden, Eugene.....	Everett
Loring, Frank C.....	Spokane
Gray, W. A.....	Winlock
Rand, V. V.....	Vancouver
Ely, W. P.....	Kelso
Cagwin, A. E.....	Kelso
Shetton, E. N.....	Seattle
Rutter, W. C.....	Seattle
Lee, C. T.....	Seattle
Cleary, John.....	Vancouver
Rust, William R.....	Tacoma
Rynerson, H. M.....	Summit District
Walters, William J.....	Seattle
Rynerson, F. M.....	Summit District

Subsequently the Credentials Committee submitted an additional report, which for convenience and clearness follows herewith:

Mr. President: Your Committee on Credentials beg leave to report a further addition of fourteen new paid members and fourteen duly accredited delegates, making a total of one thousand and thirty-one (1,031) who are legally entitled to be present and participate in the proceedings of the Seventh Annual Session of the Congress.

PHILIP S. BATES, Chairman.

## ACCREDITED DELEGATES.

## COLORADO.

Schneider, George A.....	Denver
White, E. L.....	Denver

## MINNESOTA.

Hutchins, Dr. E. A.....	Minneapolis
Boutele, P. D.....	Minneapolis
Deringer, O. S.....	St. Paul

## NEBRASKA.

Schoeuleber, L. K.....	Ceresco
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## OREGON.

Abraham, Alfred.....	Roseburg
Fenn, R. W.....	Roseburg
Thomas, R.....	Grant's Pass
Stovall, Dennis H.....	Grant's Pass
Conklin, Arthur.....	Grant's Pass
Cowgill, W. C.....	Baker City

## SOUTH DAKOTA.

Peterson, John.....Deadwood

## WASHINGTON.

Beaver, George.....Spokane  
 Allen, Mrs. John B.....Seattle  
 Allen, John B., Jr.....Seattle

PRESIDENT RICHARDS: We will now have an address by Mr. M. E. Dittmar of California.

Mr. Dittmar's address will be found in Part II. of this report.

The Secretary read the following letter::

Seattle, Wash., Aug. 24, 1904.

Mr. J. H. Richards, President American Mining Congress, Portland, Oregon.

Dear Sir: Your kind telegram last night was received and passed to the proper authorities. The President of the Chamber of Commerce has made reply by wire to you to-day, thanking you on behalf of the Chamber of Commerce and the good citizens of Seattle for the congratulations and expression of good wishes from you. I take this means of again thanking you, and through you all the members of the Mining Congress.

Yours truly,

W. H. LATIMER, Secretary.

COLONEL CRAWFORD, OF OREGON: I move that this convention adjourn until half-past 2 this afternoon.

PRESIDENT RICHARDS: Let me suggest that a special order was provided for this afternoon at 2 o'clock.

COLONEL CRAWFORD: I withdraw my motion upon that suggestion, Mr. President, and move that we adjourn until 2 o'clock.

The motion was seconded.

PRESIDENT RICHARDS: Before we adjourn the Secretary has a resolution to read.

The Secretary read Mr. Thurston Daniels' resolution, No. 19, and the same was ordered referred to the Committee on Resolutions, and the same will be found printed in the proceedings of the last day.

Whereupon the Congress adjourned until 2 o'clock P. M., August 25th.

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#### FOURTH DAY—AFTERNOON SESSION.

The Congress was called to order by the President.

PRESIDENT RICHARDS: Members and Delegates: The hour has arrived when we are to take up the matter of special order for this afternoon as fixed by this Congress. I ask the indulgence of this body for a few moments, that I may make a general statement as to the purposes of the committee in presenting this question to this session.

When I see the great influence that the coal fields of the East have had on the industrial development of that rich section of our country; when I see the mighty influence that the iron fields of Alabama have had in wiping out the sectional differences that have so long beset our land; when I see the influence that the silver mines of Nevada have had upon the finances of this nation in its hours of trial; when I see the streams of gold that have flown from the State of California to sustain this nation's credit throughout the world, and when I see the riches that have come from the Central Western States to enrich their citizens within their borders, and last, but not least, when I see the streams of gold and other metals that are coming from the great empire of Alaska to enrich the entire nation, I conclude that Alaska is not a sectional part of this coun-



try. When these things appear to a man who takes them in their comprehensive sense, and when he sees the American Mining Congress come before the mining sections of this country to act as a means by which the mining industry can speak to this nation, you can readily understand that we are anxious that this Mining Congress may take the highest stand that an organization has ever taken in this country which is interested in the industrial development of our nation. Now, you have reached a period in your deliberations when you touch a point near to my heart, and I want to make these statements, that you may make no mistake when you locate the permanent business headquarters of the American Mining Congress. I am proud to see the State of Utah come here and ask that the headquarters of this organization be placed in their beautiful city.

I am aware that the American Mining Congress, under its former name of the International Mining Congress, has been to some extent dishonored in the home of its birth, the State of Colorado, and I am fully conscious that there are many men in that State who do not now understand the aims and purposes of this Congress, for if they did they would be willing to come here and ask the child to which they gave birth in that State, to come home and help redeem them from their mistaken ideas of mining in this country.

The East as well as the West is interested in this great question that you are now about to determine; not only the East, but we also extend the hand of good fellowship to the nation on our North. I love that country, because I believe that there is going to be one of the great fields that will help to establish another free country for a free people. Delegates from Canada have come here and asked me time and again, "We want to know what are the aims and purposes of this body, as we want to follow in the wake of your leadership." We want to speak through the gates of El Paso next year to the people on our Southern border. We want to have the people of Mexico understand what mining means to the industrial development of a great people, and we expect to speak to them at El Paso in terms that they can not misunderstand; and back of it all, but not least, we want to have an organization here that will command the respect of the best business thought of this entire nation.

I have talked with many of your wealthy men in this country, and they say, "when you show us that your Congress is worthy of our confidence, and has some permanency and stability to its purposes, you can count on us for our support to the extent of millions, if you desire it."

We want to take such action in this matter as will command the respect of the entire industry of mining from the shores of the Pacific to the waters of the Atlantic, and from the southern borders of Mexico to the northern borders of Canada, and from there on to the North Pole, embracing the entire district of Alaska. I think it is one of the most serious things that has ever been brought before the American Mining Congress, and rather than make any mistake and do an injustice to the industry of mining, I would ask you to postpone it for another year, or longer, if necessary. The aim and purpose that your Board of Directors had in bringing this to your attention was not so much to locate it now as to allow the mining industry of this entire nation to know what this Mining Congress means, and what its ultimate purposes are going to be. When you see the magnificent wealth that the mining industry has given to this country, the great smelters and marvelous industrial development of the East, the great cities it has brought forth like Pittsburgh; when you see that the entire transportation of this country is supported by a tonnage from mining amounting to fifty-two per cent. of the entire freight traffic, then you can understand what this means, not only to the railroads and smelters, but what it means to every city in this land. It is a great question, and I want you to enter upon it, as the gentleman said from this platform the other night, we want it opened up on the theory of prayer and fasting. It is a serious question. We are aiming to command the respect of the greatest intellects of this country, as well as to command the respect of the prospector and the miner. That attained, you

will have force and power. It is not so much what Utah or Colorado may offer to this Congress as a donation for locating this home there, that impresses me, generous as it may seem, but I know that irrespective of what those States may offer, if you call upon the miner and the business man with understanding and intelligence, every miner will contribute his mite, every mine owner his dollar, and every millionaire of his surplus, to help you to establish a home that will appeal to the mining industry of the world.

We expect that wherever you locate this home we shall build there a temple dedicated to the mining industry which will appeal to the business sentiment of the best nation on earth, the American nation. And it is out of that kind of sentiment that you will bring forth the best minds, the best men, the best character that will come into this Congress, and their appeals will be heard from Alaska to Washington, and the nation's representatives will pay attention to what this Congress may say.

We will have in that temple, dedicated to the mining industry, an assembly room adorned with art, through which this Congress can speak with force and power, and around it there will be galleries where the commercial ores of every State in this Union, as well as Canada, Mexico and any other nation that is interested in this industry, can be correctly classified and exhibited, so that a man in London or in Egypt can send word to that headquarters and find every mineral, and learn how to handle it, which is produced in any State in this Union. Therefore, I ask you when you enter upon a deliberation of this character that you do it with the most sober thought. I told the miners at Deadwood when this Mining Congress was resuscitated, that in its infancy it must be cradled in the arms of the miner; and it was the mining men and prospectors of Deadwood that helped to give this Congress the vitality that you see at this session. Now, while in its infancy it has to be cradled in the arms of the miner, in its youth it must be moulded in the best business thought of this nation, and finally it must be guided by the highest intelligence of all; so when you enter upon these deliberations, recognize that we are striving to bring out of this session the best thought, the best heart, and the best manhood of the greatest industry in our country.

If out of this Congress, with all the eloquence that we have had displayed relative to the wealth of gold, iron, coal and silver, we do not produce greater men than this nation has ever seen, then your whole labor has been in vain. That is the crowning triumph of our great nation; it is the crowning triumph of civilization; and it is out of this Mining Congress that we expect to present to this nation a greater manhood.

Now, when you locate this business headquarters, remember that there will be built a temple which shall be dedicated to the industry of mining; and I ask you to enter upon your discussion of this subject with that sober and candid deliberation that will bring out the best thought of this Congress, and if then you are not satisfied that in the interests of mining the place has been properly selected, I ask you to postpone it until another session of this Congress.

JOHN DERN, OF UTAH: Mr. President: As you have already stated, the selection of a permanent home for the Mining Congress having been made a special order for this afternoon, in order to bring it properly before this Congress, I move that Salt Lake City be designated as the permanent home of the American Mining Congress.

The motion was seconded.

COLONEL CRAWFORD, OF OREGON: Mr. President; I have heard with feelings of the deepest and profoundest respect what you have so ably stated as a preamble before we proceed with the deliberations of this Congress upon the subject which is now before us. I fully agree with you that this Congress of American miners is not yet ready to settle down at any one place in the United States. I have no special interest in any city of the Union, but I am interested from the bottom of my heart in the wel-



fare of this American Mining Congress, which in itself is one of the most notable propositions that has been presented to the American public or to the world. We are here in embryo; we are not as yet crystallized. We are just upon the seventh anniversary of the American Mining Congress, and its future requires a great deal of consideration and the highest intelligence of the American miner. Utah has presented everything that she could present, and we heartily thank her for her distinguished consideration, but we do not want consideration from any State of the United States. I represent to-day 100,000 miners, and I know that each one of them will give \$10.00 per capita to build a fabric as soon as—

MR. JOSEPH, OF UTAH: I rise to a point of order, Mr. President.

PRESIDENT RICHARDS: State your point of order.

MR. JOSEPH: My point of order is that Colonel Crawford is proceeding to talk on the question of a postponement. There is a motion before the house, and he is not talking to the motion. If any one here had any objection to the establishment of permanent headquarters, his time was when the Committee on Resolutions brought in the resolution to establish permanent headquarters. A regular program was arranged and this subject assigned to this session at 2 o'clock.

PRESIDENT RICHARDS: The point is well taken. Was there a second to the motion?

The motion was seconded.

PRESIDENT RICHARDS: It has been moved and seconded that Salt Lake City, Utah, be named as the permanent business headquarters of The American Mining Congress. Are you ready for the question?

MR. J. F. CALLBREATH, OF COLORADO: Mr. President: I move that the motion be amended by substituting the name of Denver for that of Salt Lake City.

The motion to amend was seconded and put by the Chair.

Hon. O. W. Powers, of Utah, then took the platform and addressed the Congress, urging the selection of Salt Lake City as the permanent headquarters of The American Mining Congress.

Mr. Lafe Pence, of Idaho, then arose and addressed the Congress in favor of locating the permanent headquarters at Denver.

Mr. Dignowity, of Pennsylvania, in a speech, seconded the selection of Salt Lake City as the permanent headquarters.

Mr. J. F. Callbreath, of Colorado, in a speech, urged the selection of Denver as permanent headquarters.

Mr. Dittmar, of California, then took the floor and addressed the convention, favoring Salt Lake City.

Mr. Jones, of Washington, then addressed the convention in favor of Salt Lake City.

Dr. J. E. Talmage, of Utah, then addressed the Congress in favor of Salt Lake City.

Mr. Cornforth, of Alaska, then took the platform and addressed the Congress in favor of Denver.

MR. PATTERSON, OF NEBRASKA: Mr. President: It is now 5 o'clock, and the gentleman who is speaking has referred to our distinguished Director of the Mint, Mr. Roberts. Mr. Roberts is here, waiting to address this Congress, before he is obliged to take the train. If the gentleman will give way for a few minutes, and continue his remarks tomorrow morning on this subject, as well as others who wish to speak upon it, I would be very much obliged. And whilst I have the floor I would make a motion, with the permission of the convention and of the Chair, that we postpone this debate until to-morrow morning at 10 o'clock.

(Applause.)

The motion was seconded.



PRESIDENT RICHARDS: Mr. Cornforth says he is perfectly willing to give way at this time provided he can close his debate to-morrow morning. If there is no objection that will be the order.

JUDGE POWERS, OF UTAH: We object to that, Mr. President. Let Mr. Cornforth finish his remarks after Mr. Roberts has concluded his address.

PRESIDENT RICHARDS: What is your pleasure on the motion as to postponing further debate on this question until to-morrow morning? Are you ready for the question?

The question was called for and was put by the Chair, and the ayes seemed to have it.

MR. JOSEPH, OF UTAH: Mr. President: I ask for a division.

PRESIDENT RICHARDS: The gentleman calls for a division. All in favor of that motion please rise.

MR. JOSEPH: Accredited delegates, only.

The Secretary counted the votes, and the President called upon those who were opposed to the motion to please rise, which they did. The Chair announced that the motion was carried.

PRESIDENT RICHARDS: We will now be pleased to hear from Mr. Roberts, Director of the Mint.

MR. DERN, OF UTAH: Mr. President: I wish to say a few words in explanation right here, with reference to those who voted in the negative on the last motion, that it was with the understanding, of course, that Mr. Roberts should take the floor now, but that we should only adjourn this debate until he had concluded his address, and then let the gentleman from Alaska finish his debate. It was not that we wished to continue this debate without interruption that we voted in that manner.

MR. PATTERSON: A word of answer to the distinguished gentleman from Utah. I would like to say that there are several, as I am informed, who desire to speak on this question that we have this afternoon been discussing, and that we would not have the time to finish it this evening. Therefore, for that reason I made the motion that we put it over until 10 o'clock to-morrow morning. I have no desire to shove off debate for or against. For that reason I think, unless every person desires to stay here and have his supper brought in and other refreshments which I would like to have sent along (laughter), I think we should adjourn until 10 o'clock. Mr. Roberts is now on the platform, Mr. President. I propose three cheers for Mr. Roberts.

Three hearty cheers were given for Mr. Roberts.

Mr. Roberts, of Washington, D. C., then addressed the convention. The address will be found in Part II. of this report.

Whereupon, on motion duly seconded and carried, the meeting adjourned until 10 o'clock A. M., August 26, 1904.

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#### FIFTH DAY—MORNING SESSION.

August 26, 1904, 10 o'clock A. M.

The Congress was called to order by the President.

The Secretary submitted an additional report of the Committee on Credentials, which in these proceedings, for convenience and clearness, follows the original report of said committee.

PRESIDENT RICHARDS: The matter under discussion yesterday is a special order for this morning. No one in this convention desires fair play and justice done more than I do. The delegates that have come

here and presented the merits of their city which is so dear to them, have come at the invitation of this Congress, with the understanding that you would seriously consider the question of locating the permanent headquarters of this body. Some of these gallant men who have made such a brilliant fight here feel that the remarks I made yesterday in launching this debate did them an injustice. In order that if any injustice has been done them it may be rectified, I desire to make a statement.

Anticipating as I did that possibly the real merits of this question might not be brought out, I stated to you yesterday that I wanted you to consider this question as you did those that were most dear to you in your business affairs, and if you were not satisfied that the merits of the great mining industry had been properly presented, you had a right to postpone it. I love the State of Utah and all it represents, and its splendid manhood. I admire the State of Colorado and all it has done for the great West. But above it all, I love the mining industry and what it means to this country. I love it for what it has done in placing this great nation foremost in the ranks of the industrial nations of the earth. I recognized yesterday morning that we were speaking to that great man who stands at the head of our Government at Washington. I recognized that we were speaking to the Senate of the United States, that Legislative body which has no peer on the earth. I recognized that we were speaking to the lower House of Congress, those great characters who have such mighty influence on the destiny of our common country, and I recognized that we were going to appeal to them to grant the mining industry a great favor by the creation of a Department of Mines and Mining, and I tried to launch this debate out upon a scale that was worthy of those great legislative bodies as well as worthy of the mining industry. I wanted to say to you that if you were not satisfied that the merits of this question had been presented, you had a right to postpone it. Some have placed an interpretation upon that language that my influence was in favor of a postponement. Do not think it for one moment. I ask you to consider this question as great men, tall men, sun-crowned, who live above the fog of personal feeling or local prejudice. I admire the brilliant fight that has been made here, and, like a thunder storm and the flash of lightning, it will clear and purify the atmosphere, and we shall yet come out glorified in the end. Now, have I made my position clear on this question? If so, then we are ready for the special order, and this matter is open for your disposition; but give the State of Utah and the State of Colorado fair consideration, and when you are ready to vote, vote as your conscience dictates in the interest of the mining industry, including both of those great States.

I believe Mr. Cornforth, of Alaska, has the right to the floor this morning. We will hear Mr. Cornforth.

Mr. Cornforth, of Alaska, then continued his address before the convention.

PRESIDENT RICHARDS: I have just received the following telegram:

Marshfield, Ore., Aug. 26, 1904.

President American Mining Congress, Portland, Oregon.

Coos Bay desires mining headquarters, and respectfully offers suitable site free and \$25,000.00 cash.

COOS BAY CHAMBER OF COMMERCE.

What is your further pleasure, gentlemen?

MR. JOSEPH, OF UTAH: I move the previous question.

COLONEL DRAKE, OF OREGON: Without any argument I desire to present this matter for consideration, namely, that the further consideration of this question be postponed until the next annual session of this Congress.

The motion was seconded and stated by the Chair.

Judge Powers, of Utah, arose and addressed the convention, opposing the motion.

COLONEL DRAKE, OF OREGON: I was not present during all of the controversy yesterday, but in view of the fact that there was a certain amount of acrimony displayed—

MR. PENCE: That has all died out.

COLONEL DRAKE: I felt that perhaps the subject had not been fully discussed and the Congress did not fully understand all the merits of the proposed movement, and that inasmuch as in the end it is up to the Board of Directors, as Mr. Pence suggests, I thought it was better for the interests we all represent that it should be deferred, and that we have a further conference upon it at a later time. I made the motion so that the question can be put before the Congress. I made my motion rather abruptly before a second could come upon the call for the previous question. I want this question put to the Congress first, and if it is lost then we can pass upon it as between Denver and Salt Lake. I think the opinion of the Congress should be taken upon this question and perhaps, Mr. President, it ought to be confined to the members of the corporation. Perhaps the delegates ought not to be heard. I merely submit this for your consideration.

PRESIDENT RICHARDS: Will you permit me to make a statement, Colonel Drake? When I was elected as presiding officer of this body two years ago it was wholly on the delegate system. We are now in the transitional stage, from the delegate to the membership system. We have invited these delegates here, expecting they will have the largest measure of participation in the great questions that are to be determined. But, as Mr. Pence has stated to you, this is now a legally organized body. We are asking the advice of the delegates and the members to direct this Board as to what it should do. The advice of a member is just the same as the advice of a delegate; it does not legally bind the corporation; but we want the advice of both. The Board of Directors have presented this for discussion in order that we may have the advice of the body, which includes both members and delegates. It is not binding upon the Board, but I assume that your Board will be of that character that it will feel morally bound by your advice.

COLONEL DRAKE: I thank you, sir. That thought only occurred to me as I rose, but I concur with your view. But I must insist that it is the right of the convention to pass upon the question as to whether they will consider it now, or hold it for future determination. I would prefer that a vote should be taken upon the question as to whether further consideration shall go over for one year from this time.

MR. PENCE: I yield to the gentleman from Nebraska.

MR. PATTERSON, OF NEBRASKA:: I wish to be heard upon this before the debate is closed.

PRESIDENT RICHARDS: Every one shall be heard so far as my influence goes.

MR. JOSEPHS, OF UTAH: Mr. President: I rise to a point of order.

PRESIDENT RICHARDS: State your point of order.

MR. JOSEPHS: My point of order is, that according to the rule, no motion to postpone to a time beyond the particular session of the assembly can be heard. I call your attention to Roberts' Rules of Order, under which we are working.

PRESIDENT RICHARDS: Under the by-laws of this body they adopted Roberts' Rules of Order to guide us in our parliamentary deliberations. Under the head of "Postponement to a Certain Day," it says:



"It is not in order to postpone to a time beyond that session of the assembly, except to a day of the next session." The point of order is not well taken.

Mr. Pence then spoke against postponement.

Mr. Patterson, of Nebraska, then addressed the Congress against postponement.

Mr. Staples, of Oregon, next addressed the Congress against postponement.

Mr. White, of Ohio, spoke against postponement.

Mr. Cook, of Missouri, spoke against postponement.

PRESIDENT RICHARDS: Has every one had an opportunity that desires to be heard?

Mr. Steele, of Alaska, addressed the Congress against postponement.

Colonel Crawford, of Oregon, spoke against postponement.

Mr. McIntyre, of Washington, addressed the Congress favoring Denver as location of permanent headquarters.

JUDGE POWERS, OF UTAH: Mr. President: In view of the fact that many delegates state that they are compelled to leave at the end of this forenoon session, after consultation with the delegates from Colorado, I now move the previous question.

The motion was seconded.

MR. PENCE: May I ask Colonel Drake again, in view of the expressions made, if he will not withdraw his motion to postpone, and let us reach what evidently this assemblage wants, namely, a test vote upon the matter. I do not hear Colonel Drake, so Colorado seconds the motion.

PRESIDENT RICHARDS: The previous question has been moved and seconded. The question now is to close the debate and submit for your determination the postponement or non-postponement of the location of permanent headquarters. How do you desire to vote? (Voices, "Ayes" and "Nos.") The question is, then, on a postponement. All in favor of that motion say "Aye"; all opposed, "No."

The motion to postpone was declared lost.

MR. PENCE: I now move the previous question, which was to substitute the name of Denver for Salt Lake.

JUDGE POWERS: I second the motion.

PRESIDENT RICHARDS: The previous question is on the substitute on the original motion. The first motion was made that Salt Lake be named as the permanent headquarters of this Congress. A motion to amend was made by substituting Denver for Salt Lake. The question now is as to whether or not Salt Lake shall be named as the permanent headquarters of this Congress.

MR. DITTMAR, OF CALIFORNIA: I wish to ask what will be the method of voting, there being many in the audience who are not entitled to vote; I should think some other method should be adopted than a vive voce vote.

JUDGE POWERS: I think it should be by call of the roll.

Mr. O'Hara, of South Dakota, addressed the Congress, arguing for Denver.

JUDGE POWERS: Mr. President: I rise to a point of order. I insist that no delegate has a right to discuss this question after the previous question has been ordered.

PRESIDENT RICHARDS: The point is well taken. I had no idea that any discussion of that point was going to be entered upon. The question now is on the substitute of Denver for Salt Lake. If the vote

is to be taken by roll, there is a very long list to call, but I do not know how to make it shorter, unless you call the States and let them answer how many are here from each State.

MR. PATTERSON, OF NEBRASKA: May I inquire, for information, whether proxies and delegates vote?

PRESIDENT RICHARDS: The question as to whether proxies vote has been discussed during this convention, and through the aid of Mr. Watson, one of your Executive Board, we obtained the opinion of one of the leading legal firms of this city, which was to the effect that in corporations of this character votes cannot be had by proxy. There is a further question here—I want you all to understand it before you vote—there are some members present who have not paid their dues under the regulations of this body. It is for you to determine whether or not they have a right to vote before they have complied with the rules.

The second question propounded by Mr. Patterson was whether delegates who are not members can vote. I stated this point awhile ago, but I will re-state it now. The delegate system was the only system in vogue two years ago. We are passing from that system to the membership system. The delegates were invited here on the presumption that they would have the right to be heard in any recommendation that goes to the interests of the Congress; therefore, in the interest of fair play and justice to those who have come here on that presumption, I think they should have a right to vote on this question of recommending permanent headquarters.

(Applause.)

MR. WHITE, OF OHIO: Mr. President: I believe all the delegates should vote, but I make one recommendation to them, that before the sun goes down to-day they become members of this Congress.

(Applause.)

MR. PATTERSON, OF NEBRASKA: I am heartily in favor of all delegates being allowed to vote.

PRESIDENT RICHARDS: It seems to me those who are interested enough to come to this session ought to be interested enough to become members. It is a small contribution that is given, and it is the only means we have to sustain this organization. But, as you have been invited here, I think in the interest of justice every delegate should have a right to a voice in this recommendation.

MR. PATTERSON: I would suggest that the States vote their delegations as they do political conventions. We have over a thousand members and delegates.

MR. DITTMAR: The difficulty with that, Mr. President, is that the State delegations are very much scattered, very few of them being located together.

PRESIDENT RICHARDS: If there is no objection, the Secretary will call the roll.

Secretary Mahon thereupon proceeded to call the roll of members and delegates, and before the result of the vote was announced cheers and applause announced that Denver had won.

JUDGE POWERS, OF UTAH: Mr. President: Representing the Salt Lake delegation, I am requested to move that Denver be made the unanimous choice of this convention for the permanent headquarters of The American Mining Congress. (Great applause.) In submitting this motion I simply desire to say that if Denver will do one-half as well for the Congress as Salt Lake would have done had you chosen that city, it will be a magnificent success for all time to come.

(Great applause.)

MR. PENCE, OF IDAHO: Mr. President and Delegates of this Congress: In behalf of the beautiful city at the eastern feet of the Rockies, I desire to acknowledge the graceful motion just made by the representative from Salt Lake, and to give him assurance that we will measure height to the splendid duty which you have assigned to us. It was the natural thing to do, and directly we shall all be glad. As Mecca is to the Mohammedan, and Jerusalem to the faithful, so is Denver to all the mining world. (Applause.) It draws unto itself as if by the power of gravitation all persons so interested, as the earth gathers to itself all of its atoms. It has all the drawing power that the pie counter has for the office-seeker. (Laughter.) Mr. President, be not in doubt, be not afraid. No duty ever yet has been assigned that noble city wherein she failed. No duty can be laid upon her shoulders that will make her stoop. Be patient with us in Colorado but a little while; we will find that even, sure line of justice that rests between the two extremes that are inevitable whenever the passions of men are aroused. We will, to our satisfaction, and to your benefit, have made easy the settlement of such difficulties in the future. We extend to you our heartfelt appreciation for your goodness and the honor.

(Applause.)

COLONEL EWING, OF CALIFORNIA: I move that we adjourn until 3 o'clock.

The motion was seconded.

PRESIDENT RICHARDS: There is a motion pending. The question is on the motion of Salt Lake making the selection of Denver unanimous, which has just been seconded by Mr. Pence.

MR. COBB, OF TEXAS: I am instructed by the Texas delegation to second the motion of the gentleman from Utah. And I am further instructed by them to say that if Denver, the proud city of the Eastern slope of the Rockies, does her duty as well as the delegation has done from Utah, the permanent home will be a success.

(Applause.)

The motion was then put to a vote and was unanimously carried, and President Richards announced that Denver had been recommended as the permanent home of this Congress.

Whereupon the Congress adjourned until 2:30 P. M. August 26th.

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#### FIFTH DAY—AFTERNOON SESSION.

August 26, 1904, 2:30 P. M.

The President called the Congress to order.

The Secretary read the following announcement:

Portland, Aug. 26, 1904.

To Officers, Members and Friends of the American Mining Congress.

The Seattle delegation wishes to announce through the courtesy of the Northern Pacific Railway Company and the management of the Bonanza Mining Company a free trip from Seattle to Silverton, Washington, and return, a distance of seventy miles, on next Tuesday morning, to visit the mines of Silverton and behold the beauties of the mountains—the Switzerland of America. This section is unsurpassed for scenery anywhere in the known world.

The Bonanza Queen Company claims the distinction of having the deepest mine on the North Pacific Coast, having a vertical depth of 1,070 feet, and there cuts the enormous ledge of 133 feet in width between well defined fissure walls.

This company is practically a close corporation, and has never advertised a single share of stock for sale. It claims the most ideal mine in North America, and the largest copper deposit as well as the richest and most accessible.



Visitors will be shown through the mine and enjoy the most delightful trip to the Coast.

Tickets will be handed out at the Butler & Dillers Hotel, Seattle, next Monday, by the committee.

JAMES GIVENS.  
R. W. RODDA.  
W. H. JONES.  
W. J. WALTERS.  
O. S. DERINGER.  
DR. E. A. HUTCHINS.  
P. D. BOUTELL.  
AND. JOHNSON.

PRESIDENT RICHARDS: We will now have the pleasure of listening to an address by James W. Abbott, of Colorado, on the subject of "Mining Men for Better Roads."

This address will be found in Part II. of this report.

Mr. Abbott then introduced the following resolution:

Resolved, by The American Mining Congress in annual session assembled, that we recognize the need for an improved standard of highways in the United States, and we urge the National Congress and all State Legislatures to make it the subject of earnest deliberation and judicious legislation.

PRESIDENT RICHARDS: I am requested by the Chairman of the Credentials Committee to state that by calling upon him he will return to you your credentials.

MR. JOSEPHS, OF UTAH: Mr. President: I desire at this time to move that a committee of three, consisting of Mr. Malcomson, of Texas; Mr. H. S. Clark, of Montana, and Mr. Steele, of Alaska, be appointed to audit the accounts of the Secretary and Treasurer, and report to the Congress before the close of the session.

The motion was seconded.

PRESIDENT RICHARDS: I will state before that motion is put that your Board of Directors has had under consideration these accounts, but has not yet acted upon them. What is your pleasure with the motion?

MR. JOSEPHS: Under those circumstances, if the Board of Directors have undertaken the task, I desire to withdraw my motion, with the consent of my second.

PRESIDENT RICHARDS: The Board of Directors will make a report to you to-morrow morning upon that question. We want every one to understand the finances of this institution before this session adjourns, and the report will be made to-morrow morning.

If Mr. Lafe Pence is in the room I wish to say to him that he is wanted on the platform.

Mr. Pence came to the platform in obedience to the President's call.

Mr. Cornforth, of Alaska (bearing a large bouquet of roses): Mr. President and Delegates: I can not understand why the ladies of the Rose Society of Portland have given me the distinction of presenting this beautiful bouquet of roses to the honorable gentleman, unless they knew something of my previous history. The first girl born in the Territory of Wyoming was a girl

(Great laughter and applause.)

MR. PENCE: So was her sister.

(Laughter.)

MR. CORNFORTH (Continuing)—and since then I have been a defender of the rights of woman, and did what I could in their behalf in Wyoming and Utah. I can not see why those rights should be accorded

them more freely in our mining States than in other States of the Union.

I esteem it an honor to present to you, Mr. Lafe Pence, on behalf of the Ladies' Rose Society of Portland, this bouquet of roses, which I ask you to accept.

MR. PENCE: Ladies: You do not know how good it seems, after some personal allusions of yesterday, to have bouquets thrown at me to-day. I thank you. Not for my own account, or for any little thing I may have done, but more because down towards the southeast is one who, when she comes to Portland, will be glad to be the friend of the sweet ladies who have been kind to her wayward and wandering husband.

PRESIDENT RICHARDS: We will now be favored with an address from Mr. F. Wallace White, on the subject of "The Investor in Mines."

This address will be found in Part II. of this report.

PRESIDENT RICHARDS: This closes our program as arranged by your Program Committee, but Mr. J. H. Lighter of Portland desires to offer a resolution.

MR. LIGHTER: I wish to offer the following resolution:

Whereas, weekly rest is necessary to all, especially laboring men; therefore,

Resolved, that it is the judgment of this Congress that all Sunday labor should be avoided as far as possible in all mining camps by mining men and miners.

PRESIDENT RICHARDS: The resolution will be referred to the Committee on Resolutions.

MR. STEELE, OF ALASKA: Mr. President: I rise to a question of privilege. I think it is one that every one in this hall will be in sympathy with. I want to speak of the man who has done more to place this Mining Congress on the foundation where it stands to-day than perhaps any other one man. I want to speak of the man who conceived the idea of The American Mining Congress, and spent his own money in order to make it a success, a man who is known in the great State of Colorado, and from there to the Pacific Ocean; a man who is known from the Pacific to the Northern part of this great American continent, who not only spent his own money and time, but influenced his friends to do the same thing, and thereby give us the Congress that we have to-day. The man of whom I speak is among you, and I want to make a motion that the Hon. Joseph T. Cornforth be presented with an honorary life membership in The American Mining Congress.

COLONEL CRAWFORD, OF OREGON: I second the motion that Mr. Cornforth be presented with a certificate of membership for life.

(Applause.)

The motion was carried unanimously.

There were calls for Mr. Cornforth. Mr. Cornforth rose and tried to address the convention, but, overcome by emotion, he bowed his thanks and sat down amid great applause.

PRESIDENT RICHARDS: I will take this occasion to say, in behalf of Mr. Cornforth, that I have known him for about a quarter of a century. He is one of the pioneers of this great West, reaching from the Missouri River almost to the North Pole. He has done more to inspire the mining industry in this Western country to that high ideal at which we now see it, than perhaps any other man in the great Rocky Mountain region. At one time in the history of this organization, when it seemed as though the honor of his State and city was imperiled, in order that it might be redeemed and this Congress placed upon a proper footing, he stepped forth and paid the expenses necessary to redeem the name of his city. (Great applause.) It is one of the pleasantest duties that I have on this occasion

to say that I am grateful that you have acknowledged the character of manhood which means so much to the mining industry of the West in honoring him with that life membership, and I thank you for it.

**COLONEL DRAKE, OF OREGON:** Mr. President: Permit me to ask everybody to join in three cheers for the father of The American Mining Congress, Joseph T. Cornforth.

The cheers were given, led by Colonel Drake.

Whereupon the Congress adjourned until 10 o'clock A. M. August 27, 1904.

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### SIXTH DAY—CONCLUDING SESSION.

The President called the Congress to order.

The following paper was read by title and ordered published in the proceedings: "The Ryan Electro-Magnetic Separator."

This paper will be found in Part II. of this report.

The Secretary read the report of the Committee on Resolutions, as follows:

Committee Room, August 27, 1904.

The Committee on Resolutions respectfully reports back the following resolution, designated as Resolution No. 19, introduced by Ex-Lieut. Gov. Thurston Daniels, of Washington, and, by unanimous vote, recommends its adoption by the Congress.

E. R. BUCKLEY, Chairman.

J. E. TALMAGE, Secretary.

#### RESOLUTION NO. 19.

By Thurston Daniels, Washington.

Whereas, the South half of the Colville Reservation, in the State of Washington, embraces within its boundaries one of the richest mineral regions in the United States, showing large bodies of gold, silver, copper, lead, nickel and cobalt, iron, asbestos, white, green and variegated marble, onyx and other valuable minerals and products of the earth; and,

Whereas, the North half of said reservation has been thrown open to settlement and the mining interests of that section have been thereby materially stimulated and developed, and the extension of lines of transportation encouraged and accomplished; and,

Whereas, legislation has for some time been pending in the Congress of the United States looking to the opening of the South half of the Colville Reservation to white settlement; and,

Whereas, such delay has retarded the development of this rich mineral region, to the detriment of the interests of those owning and operating mining properties in that district; therefore, be it

Resolved, by The American Mining Congress, in annual session assembled, that the Committees on Indian Affairs of the House of Representatives and of the United States Senate, be, and they are hereby respectfully memorialized to hasten the enactment of necessary legislation for the immediate opening of the South half of the Colville Reservation to white settlement.

**PRESIDENT RICHARDS:** What is your pleasure with the resolution just read, and the report of the committee?

**MR. JOSEPHS, OF UTAH:** I move that the report of the committee be adopted.

The motion was seconded and the report unanimously adopted.

The Secretary submitted the report of the Committee on Resolutions regarding Resolutions Nos. 17 and 18, as follows:



Committee Room, August 27, 1904.

The Committee on Resolutions respectfully reports back the following resolutions, designated as Resolutions Nos. 17 and 18, introduced by Mr. Dodge, of Oregon, and Mr. Josephs, of Utah, without recommendation, as the purpose of these resolutions is covered by that of the general resolution of thanks, designated as No. 20.

J. E. TALMAGE, Secretary.

#### RESOLUTION NO. 17.

By Mr. Dodge, of Oregon.

Resolved, that the members of The American Mining Congress and the delegates in attendance thereto and their wives and their lady friends hereby extend their hearty thanks and appreciation to the Commercial Club, of Portland, the officers thereof, and to the Reception Committee of ladies, and to the Reception Committee of gentlemen, in charge of the reception, for the enjoyable and pleasant entertainment given in their rooms last evening. Every one who was present will always remember the occasion with great pleasure.

#### RESOLUTION NO. 18.

By H. S. Josephs, of Utah.

Resolved, that the thanks of The American Mining Congress individually and collectively, be extended to the speakers of the convention for its intelligent efforts; to the Press for its uniform courtesy and efforts to make this Congress a success; to the Commercial Club for its elegant reception to all the delegates; to the ladies of Portland for their successful treatment of the ladies of the delegates; to all the officers of this convention, the several committees and employes, for their untiring efforts in behalf of the success of this Congress.

The Secretary also read in connection with the preceding resolutions and report, the following resolution and the report of the committee thereon:

Committee Room, August 27, 1904.

The Committee on Resolutions respectfully reports back the following resolution, designated as Resolution No. 20, introduced by this committee, and, by unanimous vote recommends its adoption by the Congress.

E. R. BUCKLEY, Chairman.

J. E. TALMAGE, Secretary.

#### RESOLUTION NO. 20.

Whereas, this Congress recognizes and appreciates that the success of this session has resulted in a large measure from the interest and attention of the Chief Executive of the United States, the Governors of the several States, especially the Governor of Oregon, the citizens of the City of Portland, especially the committees in charge of entertainment and arrangements, and to those who have participated in the deliberations; therefore, be it

Resolved, that The American Mining Congress, in convention assembled in the City of Portland, does hereby extend its grateful thanks to—

His Excellency, Theodore Roosevelt, President of the United States.

The representatives of President Roosevelt, Mr. T. A. Rickard, and Mr. S. W. Mudd, both of whom have been in attendance upon the meetings of this Congress.

The representatives of the Department of the Interior, and Department of Agriculture, Mr. Gifford Pinchot, Chief of the Bureau of Forestry, and Mr. F. H. Newell, Chief of the Reclamation Service, also appointed by the President of the United States.

The United States Geological Survey and their representatives, Mr. S. F. Emmons, and Mr. J. S. Diller, for interest and participation in the proceedings of this Congress.

The Governors of States and Territories, and especially Governor Geo. E. Chamberlain, of Oregon.

The citizens of Portland, their clubs and commercial organizations, and especially to His Honor, Mayor Geo. H. Williams; the Commercial Club, the Woman's Club and their President, Mrs. P. J. Mann; the Portland Rose Society and their President, Mrs. Rose Hoyt, and the local committees on arrangements and entertainment.

The representatives of the Press, who have so fully and ably reported the proceedings of this session.

The Portland Railway Company, and the City and Suburban Railway Company.

The management of the Lewis and Clark Fair.

The management of the Multnomah Fair Association.

The management of the Cordray Theater.

The speakers who have so ably addressed this convention.

And the President, Secretary, and other officers of this Congress; the stenographers and other employes of the Congress.

MR. COBB, OF TEXAS: Mr. President: I move the adoption of the two resolutions just read, with the report of the committee thereon, by a rising vote.

The motion was seconded and the resolutions unanimously adopted.

The Secretary also submitted the following report of the Committee on Resolutions:

Committee Room, August 27, 1904.

The Committee on Resolutions respectfully reports back the following resolution, designated as Resolution No. 21, introduced by Mr. Abbott, of Colorado, and, by unanimous vote, recommends its adoption by the Congress.

E. R. BUCKLEY, Chairman.

J. E. TALMAGE, Secretary.

#### RESOLUTION NO. 21.

By Mr. Abbott, Colorado.

Resolved, by The American Mining Congress, in annual session assembled, that we recognize the need for an improved standard of highways in the United States, and we urge the National Congress and all State Legislatures to make it the subject of earnest deliberation and judicious legislation.

It was moved and seconded that the report of the committee be adopted.

The Secretary submitted the report of the Committee on Resolutions concerning Resolution No. 9, substitute, introduced by Mr. Gibens, of Washington, recommending that said resolution be referred to Mr. Newell, of the Commission created by the President of the United States.

PRESIDENT RICHARDS: What is your pleasure with the resolution?

MR. DIGNOWITY: Do I understand that means three claims, with an additional one for the discoverer, in a district?

PRESIDENT RICHARDS: No, it is in a drainage area. Whether the drainage area includes the whole Yukon territory or not I can not tell.

MR. SNYDER, OF COLORADO: I would like to ask the proposer of the resolution what was the idea of introducing it?

PRESIDENT RICHARDS: This resolution was before the body the other day and the word "district" was used, and it was objected that that did not make it definite, now they have substituted "drainage area."

MR. BUCKLEY, OF MISSOURI: This resolution was returned to the author of it, and he returned it to the committee with the suggestion

that we use the substitute "drainage area." I did not hear an expression of opinion as to whether drainage area, or creek, or river, would apply in that case; but it meets the approval of the committee, so far as that is concerned.

MR. LAKE PENCE: Inasmuch as Mr. Steele, of Alaska, is specially interested in representing the territory concerned and he is not at this moment present, I would suggest that it be passed until a later time when he can be present.

PRESIDENT RICHARDS: If there is no objection the Chair will adopt the suggestion.

The Secretary read the following message, and also the following letter:

Spokane, Wash., Aug. 25, 1904.

Irwin Mahon, Secretary American Mining Congress, Portland, Oregon.

Dear Sir: We beg to call your attention to the invitation extended by the Spokane Chamber of Commerce to the delegates in attendance at the sessions of the American Mining Congress to visit Spokane. If we are notified in advance we shall take pleasure in having a committee meet them at the depot and show them about the city.

Spokane is the headquarters for the greatest mining section of the Pacific Northwest; that tributary to Spokane are the greatest silver-lead mines of the world, the famous Coeur d'Alenes of Northern Idaho.

With best wishes, we remain

Very truly yours,

L. G. MONROE, Secretary.

The Secretary reported the following resolution prepared by a special committee appointed for the purpose, and upon motion duly seconded, the resolution was unanimously adopted by a rising vote:

To The American Mining Congress' Seventh Annual Session, Portland, Oregon.

Whereas, By the death of the Honorable John T. Grayson, late Third Vice President of this Congress, and an honored citizen of the City of Portland, and State of Oregon, this Congress has been deprived of a capable and useful official and member; the mining industry of an efficient and zealous worker, and the City and State of a loyal and honorable citizen; therefore, be it

Resolved, that this Congress hereby expresses its profound sorrow for the death of the Honorable John T. Grayson, and tenders to the wife and family of Colonel Grayson this expression of its sympathy in their bereavement, and directs that this resolution shall be spread upon the records of this Congress, and a copy thereof suitably engrossed forwarded to the widow and family of the deceased.

R. C. PATTERSON,

C. W. SCOTT,

COLONEL DRAKE,

Committee.

Colonel Crawford of Oregon extended an invitation to the members of the Congress to visit Josephine County and Grant's Pass, promising to take care of them and show them many points of interest.

#### SECRETARY'S REPORT.

PRESIDENT RICHARDS: In order to make clear in your minds the difference between the two funds that have been used in connection with this Congress, before reading the report of the Secretary I desire to make a statement. The City of Portland agreed to pay to this Congress for its exclusive use the sum of \$3,000.00. The citizens of this city deposited that amount in the treasury. The citizens of Portland also raised a fund to meet the local expenses of this organization, its Secretary, entertainment, halls, etc. Something like \$7,500.00 has been raised for that purpose by the City of Portland. Of this sum \$3,000.00 was turned over to the Congress itself, and that is the only fund of which this Congress ex-



pects to report to you. The other fund was paid out by the citizens of Portland, under their direction, Mr. J. Frank Watson acting as the representative of the business men of this city, and he will make a statement to you relative to that.

I want to say to you before reading this report that your Board of Directors held two sessions, night before last and last night, going into every item and every detail, and the report we make to-day meets the unanimous approval of the entire Board. We had on that Board during this investigation Colonel Ewing, of California; Mr. Dern, of Utah; Mr. Patterson, of Nebraska, and Mr. Watson, of Portland. Every detail was investigated and we approved the report of the Secretary as I am about to read it to you. There were some things in that account that the Board did not approve of; they were stricken out, and every item was corrected to meet the entire approval of the Board. Colonel Ewing finished the details of the report, with the authority of the Board, and as he is one of the hardest headed business men I have ever had the pleasure of knowing, I feel that when he sets his approval upon an accounting we can endorse it confidently and heartily. The report reads as follows:

To the President and Members of The American Mining Congress.

Gentlemen: I herewith submit for your approval my annual report as Secretary of The American Mining Congress, from September 13, 1903, to August 27, 1904.

#### SUMMARY OF ACCOUNT.

Cash Portland Guarantee Fund.....	\$3,000.00
From membership and dues.....	1,404.00

Total cash received and deposited with treasurer.\$4,404.00  
There is due from members \$508.00.  
There are no outstanding bills that I know of.

IRWIN MAHON, Secretary.

Cr.

#### Cash Statement.

From City of Portland.....	\$3,000.00
From membership certificates and dues.....	\$1,404.00
	<u>\$4,404.00</u>

#### DISBURSING ACCOUNT.

Dr.

#### Cash Statement.

Paid back bills from last session.....	\$ 185.30
Secretary's salary one year.....	1,800.00
Postage during the year.....	158.20
Expressage .....	18.55
Printing literature during year.....	186.55
Telegraphing and messengers.....	38.40
Traveling expenses of secretary.....	332.05
Incidental expenses .....	118.73
Stenographing .....	110.10
Stationery and cuts for headings.....	23.30
Office rent at Carlisle, Pa.....	120.00
Daily papers at Portland.....	9.90
Hotel bills at Portland.....	150.55
Expense and translating foreign letters.....	74.25
Balance cash in bank.....	1,077.12 ....
	<u>\$4,404.00</u>

On motion of Mr. Dignowity, of Pennsylvania, duly seconded, the report was unanimously adopted.

PRESIDENT RICHARDS: Mr. Watson will make a statement in regard to the expenditure of the other fund.

MR. J. FRANK WATSON, OF OREGON: Mr. President and Gentlemen: About \$8,000.00 has been raised by the citizens of Portland, the disposition of which will be shown in a full and complete statement with vouchers, later on when I complete paying the bills. The amount paid to the Congress, as you have heard by the Secretary's report, was \$3,000.00, the balance has been expended in various ways under my direction, with the aid of the Secretary. We have been very well satisfied with the result, and trust you will all feel that the Congress has been a success. The citizens of Portland feel that lasting benefit will result to the city, and I wish to express on their behalf thanks to the members of this Congress for having given us such an interesting session.

PRESIDENT RICHARDS: I wish to state for your information that Mr. Watson has kept an account in a business-like manner, and has a voucher for every dollar expended which he will report to the citizens of this city.

MR. PATTERSON, OF OMAHA: Mr. President: I would like to move just at this time that the Congress express its gratitude, appreciation and thanks to our friend, fellow-officer and director, Mr. J. Frank Watson, for what he has done in helping the citizens of Portland to make this Congress a success.

The motion was seconded and unanimously carried.

PRESIDENT RICHARDS: We now have in the treasury, as I have just read, \$1,077.12, after all bills have been paid. In addition to that we have \$3,000.00 in a certified check from the City of El Paso, which makes \$4,077.12. I make this statement because I want the people of this country to know, that it may go into the record that it has been the strenuous effort of the officers of this body to place it on a clean-cut, business basis. During the coming year we expect to adopt a system of duplicate vouchers for every cent expended. You have no idea what difficulties have been surmounted. The first business organization, if you may call it a business organization, was made up of delegates from all nations on the globe. There could be no business system adopted because we had no finances. The Secretary could not do all the work. Coming from that system of delegates over to the system of members, which will finally, in my judgment, prevail, there will come with it that business system and management which will commend itself to the best business thought of the day. That is our aim. Now, in order to assist in accomplishing that end, you authorized me to appoint a committee to give that careful consideration which should be given, and place before you for nomination as directors of this body that class of men which would meet the approval of that committee as being men of such high character that it would be a guarantee to the people who contributed their funds to this body that they would be honestly and ably expended. I have the report of that committee from its chairman, which reads as follows:

To the President of The American Mining Congress. -

Your Committee appointed to select and recommend to the Congress names of the members of the Congress for the Board of Directors to serve during the ensuing year, after careful consideration, with the view of selecting members who would give this their personal attention, most respectfully and unanimously recommend the following named gentlemen:

J. H. Richards, Idaho.  
Col. Thomas Ewing, California.  
E. R. Buckley, Missouri.  
A. W. Gifford, Texas.  
John Dern, Utah.  
William Lennox, Colorado.

J. Frank Watson, Oregon.

Joseph T. Cornforth, Alaska.

George W. E. Dorsey, Nebraska.

THOMAS EWING, Chairman.

It was moved that the report be adopted.

MR. JOSEPHS, OF UTAH: I move as an amendment that the Secretary be instructed to cast the ballot of the entire Congress for the names reported by the committee to serve as directors during the ensuing year.

The amendment was accepted by the mover of the original motion.

The motion having been stated by the Chair and the question called, the motion was put to a vote and unanimously carried; whereupon the Secretary cast the ballot of the Congress for the parties named as directors and declared them unanimously elected.

PRESIDENT RICHARDS: That covers all business that I have on the desk.

MR. JOSEPHS, OF UTAH: Mr. President: I have a motion to make. My attention has been called to the matter by Mr. Cobb, of Texas, that in order to bring the subject matter of this Congress properly before the Government of the United States and the several state governments, that a copy of the proceedings when printed and published be forwarded to the executive officers of the United States, to the National representatives at Washington, and to the governors of each State and Territory of the Union.

I therefore move that copies be sent as suggested.

The motion was seconded and carried.

PRESIDENT RICHARDS: Under the rules every member and delegate is entitled to a copy of the annual proceedings, and a copy will be mailed to each one as his address appears upon the record.

COLONEL DRAKE, OF OREGON: After conference with the chairman of the Committee on Resolutions we have made the necessary change in this Alaska resolution, so that it now reads, "Each particular creek and its drainage area."

PRESIDENT RICHARDS: What is your pleasure with the resolution?

MR. PENCE: As no one seems to have expressed any interest in it, why act upon it at all? I move that it be indefinitely postponed.

The motion was seconded and carried.

MR. F. WALLACE WHITE, OF OHIO: I beg that I be extended the privilege of taking the gavel in hand for a few moments. I move that all members and delegates of this Congress extend their heart-felt thanks to our President for his good work in behalf of this Congress, by a rising vote.

Mr. Lafe Pence seconded the motion, which was carried by a unanimous rising vote.

Mr. Josephs, of Utah, then proposed three cheers for President Richards, which were heartily given.

PRESIDENT RICHARDS: My friends, perhaps it might be appropriate to say one word in reference to this compliment which has been extended to me. I think every man in an official position in an organization like this should be judged by what he does rather than by what he says. I recognize that he is the greatest man who renders the highest service to his fellow-men, and he should be judged by that service. I have no adequate language to express the gratitude that I feel for the many compliments that have been extended to me, but so far as my services to you have merited that compliment, that is what draws from me my



feelings of gratitude. Every man has a right to feel proud of any merit he possesses. I have simply taken the position I have without any desire to occupy it only so far as I may be able to serve you. While I appreciate more than I can express the honor that has been conferred upon me, I also appreciate the expression which you have given, that I have conferred an honor by my conduct upon this organization. The time has been, and is yet, when we are seeking men to join this organization because we need their help. The time is coming, and is near at hand, when they will come to this Congress and ask permission to join it because they need its help. You cannot understand how much I appreciate the wisdom that this body exercised in the selection of headquarters. I admire the state of Utah, and the contest those gallant men made here; but it is my judgment after all of this discussion that you acted with wisdom in behalf of this Congress. I think it will appeal to the miner and to the business man. We appreciate the generous offer given by Salt Lake City, of a lot and other assistance. That was not what we were seeking. Your Board of Directors did not ask any one to make any gift to this body in order to secure its headquarters. In their love for the mining industry and the desire to have you in their midst, they did generously make you an offer; but we expect yet that every miner who loves his profession—if I may call it that, and it ought to be called that—will be willing to donate of his mite, and the business man and mine owner of their plenty, and possibly the millionaire of his abundance, to help honor the mining industry with a temple worthy of its magnificence. It does not matter whether it takes one year or ten to accomplish a great result like that; but when it is done every man connected with its construction, either by donation or personal assistance, will feel that his name is honored by being connected with it. This is our aim, and it has been in my thought in the sense suggested to you the other day, on the theory of prayer and fasting. I had no selfish motive in these matters; I sought no distinction; but I am seeking to bring up the mining industry to the attention of the people of this country in a manner that is worthy of so great an industry and so great a country. I have been seeking to bring out as sustaining and upholding it, men of that type and character, who stand as a guarantee to the world that the highest system of business and intelligence shall be applied to every detail of its management. (Applause.) If in that effort I have rendered you a service, as your expression seems to indicate that you think I have, for that I feel profoundly grateful, and at this time I simply thank you for that, and tender to you whatever service in whatever rank I may, whether in the lead or in the rear, all I possess of heart, brain and energy.

**MR. DORSEY, OF NEBRASKA:** Mr. President: I move that this Congress appoint a committee of three to take charge in Congress of the bill creating a Department of Mines and Mining; and I would suggest Senator John H. Mitchell, of Oregon, as chairman; Hon. William A. Sulzer, of New York, of the House of Representatives, and Hon. E. W. Martin, of South Dakota.

The motion was seconded and carried.

Mr. Daggett, of California, then addressed the Congress on the general subject of mining.

Mr. Cook, of Missouri, then addressed the Congress on "Mining in Southwest Missouri."

Mr. Cobb, of Texas, was called upon, and talked on El Paso, the next convention city.

**COLONEL CRAWFORD, OF OREGON:** Mr. President: Before we adjourn I would like to bring to the attention of this Congress the fact that we as a body make it plain to the practical, hard-fisted miners that they are one of us, and that we hope they will join us. We want practical miners to be with us in our deliberations, and we desire to extend to

those men who, from the bowels of mother earth, extract the riches for the wealthiest men in our land, an invitation to participate in our meetings.

MR. DIGNOWITY, OF PENNSYLVANIA: At our last meeting in South Dakota a resolution was adopted by this Congress to the effect that it go in a special car, upon the invitation of Dr. Holmes, Manager in Chief of the Bureau of Minerals at the St. Louis Exposition, to attend that exposition in a body. I would like to inquire what has become of that resolution.

PRESIDENT RICHARDS: The Secretary will answer; he was present at that time.

SECRETARY MAHON: There was a resolution passed at the last session of the American Congress at Deadwood, South Dakota, advising the President of the Congress to appoint a committee of twenty to attend the St. Louis Exposition. Of that committee the President and Vice President of the Congress at that time were requested to be members.

MR. JOSEPHS, OF UTAH: Mr. President: It seems to me we have overlooked one very important personage here in our bouquet throwing. I think we have forgotten the Secretary. I move that the thanks of The American Mining Congress here assembled be tendered to the efficient Secretary, Colonel Mahon, for his diligent efforts and zeal in behalf of the success of this Congress, and the uniform courtesy he has displayed towards the delegates and members.

MR. DAGGETT: I desire to offer an amendment including the Secretary's lady stenographers.

Texas seconds the amendment as well as the original motion.

PRESIDENT RICHARDS: I want to make a statement, as a matter of justice to a man with whom I have been more intimately connected probably than any man in this Congress to-day. A more tender-hearted, truer man, so far as his understanding goes, I have never known. Our correspondence has been of the most intimate character; it has been as beautiful as the correspondence between a mother and her child. I know the motive that actuates the heart of that man in reference to the Mining Congress. I am making this statement in justice to the character of a man that to some extent has been assailed; statements have come to my ears directly reflecting upon his character. I want to say to you that that was a misunderstanding; it simply had reference to business methods and not to his good heart. I ask you not to amend that motion, but let that motion be a special honor to the man who has honored this institution so long.

MR. DAGGETT: I withdraw my amendment with the consent of my second.

PRESIDENT RICHARDS: In making that statement I do not want to detract from these young ladies, whose services have been of the highest quality. Give them a special and distinctive honor; but this motion means something to the Congress. Mr. Mahon has been with it ever since it dawned, and from him have I gathered whatever inspiration I have given to this organization. All in favor of that motion signify the same by rising.

The resolution was unanimously adopted by a rising vote, and three cheers were proposed by Mr. Josephs for Mr. Mahon, which were enthusiastically given. Mr. Mahon was loudly called.

SECRETARY MAHON: Mr. President, Ladies and Gentlemen: I hardly know how to thank you for this evidence of your appreciation of my labors. I have been with this Congress from the very hour of its

birth. I tried to do my duty honestly and honorably. I have never asked one farthing for my services. After the reorganization at Butte our Board of Directors saw proper to consider the question of compensation. What compensation I have received you are all now aware of. With it I am entirely satisfied, and I retire as Secretary of this Congress hoping that I may carry away with me your best and kindest wishes. That is all the consideration I ask at your hands, and if I receive it, it is more than I deserve.

I thank you also for your consideration for my stenographers. They have been most faithful, working early and late for almost six months, and I was glad to hear them mentioned before this Congress, and I trust you will see proper to recognize them by a special resolution. Gentlemen, I thank you.

MR. DAGGETT, OF CALIFORNIA: Mr. President, I now renew my motion that the lady stenographers be given a vote of thanks by this convention.

The motion was carried.

MR. COOK, OF MISSOURI: I think a vote of thanks should be given to the Program Committee, including Mr. Patterson, chairman of that committee, and I make that motion.

The motion was seconded and carried.

MR. STEELE, OF ALASKA: Mr. President: I want to thank this Congress for what it has done for Alaska. Alaska is all that you have been told about all other localities put together; Alaska is everything, even an orphan; but we feel less outcast now that The American Mining Congress has adopted that orphan. We feel that its action will give us what we have so long desired. We feel that the next session of Congress of the United States will grant us a delegate, and that we shall no longer be taxed without representation. We shall be with you at El Paso next year, for Alaska will henceforth be a factor in this Congress.

(Applause.)

Mr. H. S. Clark, of Montana, read a few words expressive of his satisfaction in the success of this session of the Congress, and of its entertainment in the Rose City, which met with laughter and applause.

Colonel Ewing, of California, moved that the Congress adjourn sine die.

MR. LAFE PENCE: Mr. President: If I may be permitted, so that we may know that donations have begun, I desire to state that Mrs. Mary K. Brittain, of The Dalles, Oregon, begs to say to the officers that it is her desire to donate to the new building in Denver an elaborately decorated cathedral window.

MR. F. WALLACE WHITE, OF OHIO: Mr. President: May I have the privilege and honor of subscribing for myself \$1,000 towards that mining temple.

PRESIDENT RICHARDS: Rev. Father McDevitt desires to make a statement just before we adjourn.

REV. FATHER McDEVITT: Mr. President and Members of The American Mining Congress: I wish to express to this body my sincere gratitude for the honor that was conferred upon me in opening this noble meeting with prayer. I wish it understood, if you please, that I was only acting as a substitute for our beloved Archbishop Christie, who is now in ill health and unable to attend in person.

Now, gentlemen, before you depart from our beautiful city, I wish to have distributed among you some specimens which I would like to have you examine, to determine, if possible, whether they are fossils or ore. They will be left to your own good judgment. Some of you, no doubt, are familiar with these specimens, but some may not be. Perhaps you



have not seen our hospitals as yet, and I am not sure that after having inspected these properly, you may feel a desire to go to some hospital. (Laughter.) I wish to present these cigars to you this morning in the hope that you will do all your smoking in this world, and not have to do any in the next (laughter and applause), and that your prayers may be somewhat like the good old darkey's just a short time before Thanksgiving. Said he, "I prayed all the week that the Lord would send me a turkey, but I never got a turkey. Then I thought there must be something wrong about my prayers; so I turned around and I prayed the other way; I prayed the Lord to send me after a turkey, and I had him in an hour." (Laughter.) I hope you will not think me in any degree irreverent if I tell you another story before we part. (Laughter.) Another poor old darkey down in Charleston, South Carolina, some years ago, when they had a tremendous earthquake and everybody was trembling with fear lest the last hour had come, rushed into the streets, threw himself on his knees and raised his hands to heaven and says, "Oh Lord, God Almighty, Heavenly Father, come down and save us poor sinners or we'll all perish. Now, please don't send down your son; this is no child's play." (Laughter.)

My dear friends, in the beginning we asked the Father, Son and Holy Ghost to bless you; so if you will kindly accept these from me I will leave them in charge of your Secretary to distribute among you with a heart full of gratitude in the name of the Archbishop. God bless you.

Whereupon, the motion to adjourn sine die having been duly seconded, was carried, and the Congress adjourned.









**PROCEEDINGS**  
of the  
**Seventh Annual Session**  
of the  
**American Mining  
Congress**

**PART II.**

CONTAINING THE PAPERS OF 1904

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## INDEX TO PAPERS OF 1904

---

Annual Address of the President, by Hon. J. H. Richards.....	7
The Relation of Mining to the World's General Advancement, by H. W. Scott .....	17
The Public Land Commission, by F. H. Newell and Gifford Pinchot....	28
Address by T. A. Rickard.....	35
Idaho and Thunder Mountain, by A. E. Borthwick.....	38
Address by Ellis H. Roberts.....	46
The Influence of Mining Men for Better Roads, by James W. Abbott...	47
The Promoter and His Place in Our Development, by E. Benjamin Andrews .....	54
The Investor in Mines, by F. Wallace White.....	69
Concentration of Copper Ores in the Southwest, by Frank H. Probert..	80
The Ryan Electro-Magnetic Concentrator, by John H. Ryan.....	110
Geology and Mineral Resources of Wyoming, by Henry C. Beeler.....	113
Mineral Resources and Mining in Oregon, by Frank V. Drake.....	119
Mineral Resources of South Carolina, by Earl Sloan.....	129
Mineral Resources of Vermont, by G. H. Perkins.....	161
The Evolution of Mining in California, by John Daggett.....	172
The Mining Industries of California, by The State Mining Bureau....	177
The Geology and Mineral Resources of Idaho, by Robert N. Bell.....	200
The Mineral Resources of Maine, by Leslie A. Lee.....	227



## OFFICERS FOR THE YEAR 1905

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J. H. Richards.

### VICE PRESIDENTS.

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E. R. Buckley.

A. W. Gifford.

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### SECRETARY.

Jas. F. Callbreath, Jr., Denver, Colorado.





## Annual Address of the President.

BY HON. J. H. RICHARDS, BOISE, IDAHO.

Gentlemen of the Congress: It gives me great pleasure to meet you again on this occasion of your annual session, and to say a few words of greeting to you before you enter upon your deliberations and proceed to take such action as may seem to you most appropriate for advancing the aims and purposes of our organization.

It was thought by your Executive Committee that it would be fitting to make a few suggestions at this time for your consideration, in relation to a few of the aims and purposes of this Congress.

What are those aims and purposes? I need make no apology for refreshing your recollection by quoting from the charter of our corporate existence, because, whenever I read those words, they give me a new inspiration for our work, as well as an authoritative revelation of our opportunity.

"To advance the mining and metallurgical industries in all their various branches within the United States; to assist in bringing about a more perfect co-operation between the government of the United States and the development of mining and metallurgy; to encourage education in practical and scientific mining, metallurgy and their allied industries; to acquire and disseminate trustworthy information bearing upon the development of the metallic and nonmetallic mining resources of the United States; to promote a more co-operative tendency in the evolution of agriculture, mining, manufacturing, transportation and commerce, and for the particular purpose of bringing the mining men of the United States into closer relations with one another, and of promoting a friendly feeling for one another through social intercourse and the discussion of mutual interests."

Therefore, if assisting in advancing the mining industry to a position commensurate with its importance; if aiding

in bringing about a more perfect co-operation between the government of the United States and the development of mining; if encouraging the application of scientific methods to all departments of mining; if promoting a more co-operative tendency in the harmonious evolution of agriculture, mining, manufacturing, transportation and commerce; if bringing representative mining men together for their mutual benefit, are worthy aims, and this Congress can materially aid in accomplishing these purposes, then it has a rightful place among the active agencies of American effort, and can, if intelligently utilized, bring richer opportunities to greater numbers of individuals, as well as insure more stability in industrial tendencies, and through these achievements confer lasting honor and advantage upon our National Commonwealth.

*Mining Congress No Accident.*

The existence of the American Mining Congress is not a result of accident. Its existence, aims and work are intended to express the necessity for a broader co-operation, based on a closer unity of general purpose, and to aid in bringing about such changes in method as will give a more beneficial direction to present industrial tendencies.

These tendencies are at bottom co-operative, and therefore healthful. The great combinations, both of capital and labor, are simply manifestations of the development of a great principle, which must be controlled and directed so as to accomplish the greatest good for the greatest number. The abuses of this principle of co-operation, whether such abuses appear in the form of rapacious trusts or lawless unions, simply present conclusive evidence of weakness in our present industrial and financial methods. We cannot afford to allow predatory promoters to rob the people of millions by the issue of watered stock on consolidated industrial plants, nor can we tolerate a state of civil war between mammoth aggregations of capital and labor. The common people, who are non-combatants in these conflicts, also have rights which can and must be maintained.

But, notwithstanding all these abuses, the tendency to combine marches steadily on, and it would be just as



sensible to talk of damming the Mississippi river to get rid of the floods, as to advocate reversing these wheels of progress and restoring the conditions of the past. The tendency may and must be guided, it must be restrained, it must be kept in proper channels, and it must be inspired with justice. Then, finally, it will be seen to be what I have called it—a co-operative tendency, by which all should benefit, inasmuch as it is better to work together than to work apart, better to work in harmony than to work in strife.

I say, therefore, that if a wiser direction were given to these tendencies, greater opportunities for individual and local growth would arise, investments in our vast industrial ventures would be safer and more permanent, the dangers and losses from financial and industrial panics would be minimized, the employment of labor would become more regular, and the remuneration of both labor and capital more certain. In other words, a more general unity of purpose in these tendencies would result. As mining largely finds a market for its product through our industrial and transportation development, if that market were less fluctuating on account of alternating periods of depression, the mining industry also would present a more attractive field for legitimate investment, and be to a less extent the sport of a merely speculative activity.

Now, since these defects in our present business tendencies exist, there must necessarily be ways and means of bringing about more satisfactory conditions. Can the American Mining Congress be made a useful and potent factor in American effort to most successfully reap the fruit of American opportunity? We say that it can.

#### *Government Aid Needed.*

In the first place we want to enlist the active powers of the National Government more fully in this work of striving for better industrial conditions. We have seen what our Government has already done in the way of directing its activities into channels which are wholly non-political, as that term is generally used, but which have a most vital

connection with the economic welfare of the people. We have seen how our Government has beneficially molded the process of settlement of the people's heritage, our vast public domain, by the institution of the Interior Department about the middle of the last century. We have seen its benign and directing influence upon agriculture through the creation of the Department of Agriculture a comparatively few years ago. We have seen the effective work already accomplished by the new Department of Commerce and Labor during the few brief months of its existence. The successive establishment of these industrial departments of our Government at different stages of the economic development of the United States is most significant. The people need these industrial departments; they need this active and intelligent co-operation of their Government in matters which are vital to their happiness and prosperity.

So it is becoming more and more a conviction with many that the Government which meets the fullest measure of its responsibility to the citizen is the one which most wisely aids in directing the industrial upbuilding of its people, not in a paternal sense, but in a co-operative sense, and to the end that there may be more unity of purpose in working out methods that will assure the greatest possible stability to the investment of capital and the employment of labor, while preserving the independence and individual opportunity of the average man.

We stand at the portals of glorious possibilities. Our country, by reason of the mechanical genius of our workmen, the executive ability of our captains of industry, and the almost unlimited abundance of cheap raw material, rather than by reason of any marked co-operation on the part of our Government in the past, has taken a leading position among the great industrial nations. Our governmental theory has been—equal rights, equal duties, and equal laws; then let the man do the rest. But conditions are changing. The rivalry of nations is becoming conspicuously an industrial rivalry. International competition is to-day more intense than ever before, because the nations of the earth are brought so much closer together by modern

facilities of communication. Careful observers are warning us that the highly perfected bureaucratic organizations of European governments are being more and more utilized in fields of industrial activity. That nation which is powerful industrially can always buy guns and ships, employ big armies to win its battles, and easily float loans to pay for them. We found that out in our own Civil War. But if you have no powerful and organized reserve of national resource back of your military display, your army and navy are liable to collapse like a house of cards when the hour of crucial strain arrives. And so we say that the United States must be better prepared than ever before to meet the influences of these mighty governmental organizations in seeking the trade of the world. How shall it do this? Simply by more effectively directing the industrial energies of its people, by opening new avenues for industrial enterprises, and by making it possible to secure better results in the old.

We have already, as I have intimated, made creditable progress in that direction. If the Agricultural Department of our Government has broadened the markets for farm products in all parts of the world by systematic efforts; if it has diffused much-needed scientific information concerning crops, soils and tillage; if it has effectively assisted the cultivator in overcoming the pests that endanger his crops; if it has helped to make agriculture more like a business calling by securing results which are more calculable and rewards which are more certain; if it has thereby invested agriculture with a new dignity and brought a greater measure of comfort and prosperity to the producers of agricultural products, then to that extent our Government has met the fuller measure of its responsibility, due to changing economic conditions, by the establishment of the Department of Agriculture at Washington.

On the other hand, if we inquire what governmental co-operation can do for the great primary industry of mining, you will find a singular parallelism with what it has so effectively done for the great primary industry of agriculture. Why? Because both these industries are producers



of raw material; because, taken together, they supply nearly all the raw material used in our arts and manufactures, and therefore any discrimination against either must react upon all the industries and occupations which are dependent upon it. This is why we contend that the reason and justification for governmental co-operation in the one case is practically the same as in the other.

*Favors Department of Mines.*

We therefore affirm that if a Department of Mines and Mining could broaden the markets for the products of our mines by intelligent investigation and official action; if it could diffuse among prospectors and miners in practical form the scientific information which would be so useful to them; if it could afford them cheap and perfectly reliable facilities for classifying and assaying the infinite variety of ores found in our extensive mineral districts; if through a revised, simplified and uniform system of mining laws and a judicious control of mining corporations in the interests of the working miner, the investor and the general public, it could lessen that element of friction and speculation which to-day in the opinion of so many condemns mining both as an occupation and an investment—if through such a department such results could be accomplished, then it must be apparent to all that such accomplishment would create a new atmosphere and a new hope, not only throughout the mining world, but that the salutary effects would react in the commercial and industrial world, and that every railroad office, every bank, every factory and every farm would feel the stimulus and reap the benefit.

In all the objections which I have ever heard or read against a Department of Mines and Mining, I have never been able to discover even an attempt to answer this query: Why has not the prospector, the miner and the investor in mines just as good a right to governmental co-operation as the farmer, the horticulturist and the investor in farm mortgages? We contend that mining, as a leading department of primary production, is just as essential to civilization as agriculture. The wheels of industry could not make a sin-

gle revolution without the products of the mine. But we are not asking our Government to assume the paternal or patronizing attitude towards the mining industry. We are not teasing it to make us any presents, but we are asking it to work with us. In this country the Government is the people, and the people are the Government; it is of them and for them. That is the doctrine when reduced to its lowest terms, and it is the only theory upon which I am making these remarks. But conditions change, and human effort and agencies must change with them. "New occasions make new duties" is as true of governments as of men. We want to preserve the individuality of the American citizen, we want to preserve the better opening, the better chance in life which has been characteristic of this country in the past. To that end we must have governmental agencies that recognize the changed conditions and are equipped to meet them—governmental agencies which apply the co-operative principle in dealing with the citizens by whom they are maintained.

*Mining Industry Would Profit.*

The Interior Department, by the aid of wise laws, is approaching the end of its mission, so far as the equitable distribution of our public domain is concerned; it has done that work well; it has made homes for a new sisterhood of states; it has kept open a resource of independent livelihood for the poor man. The Department of Agriculture has supplemented its efforts, has enhanced the value of our agricultural products by untold millions, and has found a permanent place in our governmental activity. A Department of Mines and Mining must logically follow. The mining industry could then speak through this Congress in its endeavor to co-operate with the Government in making the mining industry one of the strongest bulwarks of our industrial fortress. This great primary industry of mining must also feel the uplift of the co-operative tendency of the age.

Recognizing the great service our Government has heretofore rendered the mining industry, especially through the work of that branch of the public service known as the

United States Geological Survey, we still feel sure that much more efficient service would result through such a department, and at the same time afford the Geological Survey, splendid as its services have been in the past, an opportunity to make one branch of its work more definite, extensive and permanent. Its reports would thereby become much more authoritative and attractive. The commercial value of such reports as pertain to mining would be greatly enhanced. The work of the Geological Survey would be more highly recognized, and its influence would be immeasurably extended through such a department. The systematic and scientific development of the great mineral sections of our country are second only in importance to our agricultural section, each, however, stimulating the other, and a very large part of the effective work of this development as well as its encouragement, must necessarily rest with the Geological Survey. It therefore becomes apparent what a directing influence over such a department the Geological Survey would possess. And it would give a much more direct, positive and influential character to this branch of our public service, and greatly to the advantage of the mining industry at large. Too much importance can not be attached to the influence such a department would have, in enlarging the scope, making at least one branch of the work more valuable, and enlarging the influence of the United States Geological Survey, and every man connected with this branch of our public service should rejoice in the hope that a Department of Mines and Mining will be early established.

If there are substantial reasons for the institution of such a department, then a general demand therefor should be made, and it should be based on arguments clear enough, expressed in terms strong enough, to be heard at Washington.

*Permanent Home Advocated.*

But if the American Mining Congress is to be what its purposes and opportunity justify, it must rest on a higher and more permanent business basis than heretofore. The blessings which have resulted from its labors are many, but



it still lacks that inherent force which commands the highest respect and attention. If it is to successfully meet the challenge of its opportunity, it must be placed on a thoroughly business basis, both as regards finances and as regards management, such as will assure it the approval of the best business thought of the day. There must be added unto it that element of permanency as an institution which begets pride in and respect for what it represents. It must be so impressed with the elements of successful effort, stability, influence, and power to serve, that it will be both feared and respected. It must rest on a financial foundation which will obviate the necessity of asking for charity in order to perform its functions. Permanent headquarters must be established, suitably equipped to carry on the work of the Congress between sessions, and this will be one of the most important questions for you to consider at this meeting. As an incident to permanent headquarters, employees must be chosen who are competent to do this work, and adequate compensation must be provided for them. One of the features of a permanent home, which alone will justify its establishment, should be a mineral collection. I do not mean an ordinary mineral collection, but such a collection as our organization ought to acquire, and which its members are in a position to acquire, by a little personal effort at a minimum expense; that is to say, the finest and most practical working collection of minerals in the world. This collection would be classified and properly cared for at the permanent home, and constantly augmented. The American Mining Congress should possess the National mineral collection par excellence, one worthy in every way of the great mining industry of America.

But that, of course, is only one of the many practical objects which may be kept in view during your consideration of this matter.

I suggest these things, well knowing that their consummation must be the mature fruition of many sessions of this Congress, but at the same time with the desire that we may have these ideals in our thoughts as members of this

organization, and work steadily towards their gradual fulfillment.

In conclusion, gentlemen of the Congress, I take this opportunity to gratefully acknowledge my appreciation of the trust you have reposed in my keeping during the two years last past. I assure you that I deeply feel and shall always remember the cordial support and generous consideration which you have uniformly shown me, and sincerely hope that my efforts to strengthen and perpetuate the American Mining Congress may in some small measure justify the honor you have conferred.

## The Relation of Mining to the World's General Advancement.

BY MR. H. W. SCOTT OF PORTLAND, OREGON.

From one whose vocation it has been to observe, comment upon and record daily for many years the important events and progress of a state in detail and of a nation generally, and of the world in its relation to such state and nation, little can be expected in the form of minutia or particulars in an address necessarily brief and general in character.

Such vocation compels definite and more or less intelligent observation and, irresistibly, naturally, if you please, leads the observer to conclusions as to causes for recent industrial and commercial achievements and present conditions in our National life; and, as well, to encourage the habit of looking ahead.

Beginning before the birth of the state of Oregon, in a territory which now embraces all of three states and parts each of two others, myself a youth, local events linked in varying degree with those of the Nation and of the world have passed into history in unbroken procession, constantly, unavoidably, demanding my closest attention and observation.

Industrial progress during this period has been so constantly accelerating, so intensified in purpose, so successful in attainment of ends that seemed but yesterday impossible, that a retrospect presents a record of miracles: Of deserts abloom, mountains removed, seas bridged, time outspeeded, distance a day's journey!

My experience as a "practical miner" was limited to a single year, in my youthful days, in the auriferous gravels of the then famous and still noted Boise Basin. The work consisted of whipsawing logs into boards, constructing therefrom flumes and sluice boxes, digging ditches, shoveling soil and gravel into the waters running through the sluices, cleaning up the riffles, squeezing surplus quicksilver



from amalgam in a buckskin sack, and retorting the remaining amalgam for the captured gold.

It was truly strenuous labor; and it was interesting in that all operations called for the exercise of intelligence, on the part of the workers. There were no experts, nor experienced old miners, nor teachers in those days. Discussions were had and estimates made on each branch of the work as it progressed, such as length of the boxes, grades for and sizes of the ditches, "pitch" of the sluices, adjustment and variation of riffles, disposal of tailings, proportioning the materials shoveled into the sluices to the amount and speed of water running through them, the use and saving of the precious quicksilver and the like, until best results were obtained from use of the limited and crude appliances at hand.

This experience of placer mining for gold, though limited, coupled with personal observation of the primitive arrastra and curious inspection of later quartz mining and of the quaint and exceedingly rude first stamp mill on a mountainside in Jackson county, and study of the resourceful inventors at their work—this personal contact with the stout men who were battling with unwilling Nature for her golden treasures made profound and enduring impress upon my mind. And this impression, though my life's calling has been such as to include observation of other activities and other fields, has deepened with the rapidly passing years, until to-day I stand, with you, in awe of the fact that this young Nation, banner in hand, leads in the front rank because of her unsurpassed mines of gold, copper, iron and coal—most potential factors in the future of the world. Without these, the enterprise and genius of the American in industrial effort would be fatally circumscribed.

A claim, therefore, for recognition as a co-worker with you can not be taken as unjust, and if I entertain the common bias for the practical men who dig wealth and solve riddles in the mine depths, it should not be considered unfounded or unnatural.

The universal commercial and industrial stagnation preceding the discovery of gold in abundance on the Pacific

Coast, historically well known to you all, had not been perceptibly relieved in the then Far West, when, as a youth, I started with my parents in the long, hazardous and arduous journey overland from Illinois to Oregon.

I well remember the conditions then existing in the great, fertile, nature-endowed Mississippi Valley. Accumulated harvests molded and rotted in the granaries. Human effort seemed to be rewarded only with paralysis. There were no markets; practically no means of transportation. There was no money to replace the decaying products of the fields and preserve values for future use. There were only innumerable "promises to pay," issued by many carelessly licensed "banks," to serve as a medium of exchange. The irresponsibility of the banks and abundance of easily-made counterfeits kept the unhappy holder of the "money" of that day awake nights, devising schemes to get rid of it to his neighbor for something more tangible before sunset next day. The glint of gold was almost unknown, and the sheen of silver legendary. Local commerce (the limit in those days) consisted chiefly in "dicker," "swapping," trading one commodity for another and taking chances all around. The principal occupation was securing lands, "breaking" plows, ox teams to pull the plows, planting corn, raising hogs, on the surplus corn for a market so far away that profits were consumed in getting there and back again. It was a plodding, unsatisfactory existence for citizens American-born. The only divertisement was the heartrending, backbreaking industry of digging burr-oak, black-oak and white-oak "grubs." It was discouraging work, that mining for tap-roots of oak grubs.

From these conditions, my father, with his family, and others en train, departed from the Garden Prairie state for the then far-away Oregon. West of the Missouri river there was no settlement save a small group of Mormons at Salt Lake; no white inhabitants, no civilization outside the occupants of the wagons and the trudging ox-drivers, slowly moving westward, until Oregon was reached. All the journey seemed to be over an uninviting waste, gray sage plains, waterless deserts, rugged mountains. And so

it remained until the American miner came to inspire and aid a transformation which has made Nebraska, Colorado, Utah, Wyoming, the Dakotas, Nevada, Montana, Idaho, California and Oregon, sovereign states and indispensable factors in the present and future Greater American Republic.

Our American miners are now steadily producing more gold, more coal, more iron and more copper than are those of any other nation.

These minerals, proven to be so abundant in the United States, are not to be taken in situ as constituting wealth. They are valueless until utilized. Personal equation is a factor in the problem of wealth-getting. The tremendous energy, courage and faith of the pioneer men, aided at times by capital, are integers to be reckoned in the sum total.

For many years I have seen, with never-abating interest, the intermittent human floods surging to occupy new fields, where gold was known to be. Sometimes I have mingled with the passing stream, sorely tempted, often, to drift with the tide—to the Fraser river, Cariboo, lastly Alaska, and on through the list.

Portions of the early receding tides, increased from new sources, flowed backward and eastward until all the Pacific and inter-mountain states were contributing gold and copper, silver, coal and iron in such increasing volume that; before fairly aware of the magic powers of American prospectors and miners, we were startled with the fact that in these minerals we had passed the productive capacity of every other nation; and were exporting the raw materials and manufactured products thereof, greatly in excess of importation of like articles.

And the full beginning is not yet; we shall be masters of the world.

This mastery will be attained, not alone from the crude minerals, but from and through the aid of their manufactured products for use in the arts, supported by exports of other products. The "Yankee Invasion" of Europe, though one of Peace, has more of force, persistency and permanence than a fleet of battleships, and the flag of commercial and industrial supremacy is there to stay. American-built



bridges, railways, locomotives, mine hoists, mill machinery, dynamos, motors, telephones, plows, harvesters and wonderful things yet to follow, will continue to supply foreign needs and bring us gold in return.

Control of the movements and disposition of the world's money metal will result in dominion over the world's commerce and over great international policies.

For a long period this Nation produced, and will continue so to do indefinitely, more gold than has any other nation. The measureless energy and inventive genius of Americans are enlarging the means of discovery, exploration and separation of gold from its associate minerals. Profits flow from the rejected rocks of yesterday. The horizon of production is being enlarged; the cream has not been skimmed from the vessel, notwithstanding the assertions of scientists a few years since. Literally, mountains are being fed to the stamp mills and enormous profits enrich the bold investors. The ocean beaches are robbed and the deserts yield riches.

With exports of value far in excess of imports there is and must be a steady flow of gold from abroad into the United States. The maintenance of these two conditions must result in placing the strings of the great international purse in the hands of the United States. The third factor in the permanency of such profound responsibility and power rests in the wisdom of the statesmen of the Republic.

He who holds the purse rules the household. This is as true when applied to the great family of nations as to the members of a household.

And yet it would be a mistake to suppose or to assume that money—even gold—is wealth in itself. It is, however, indispensable to production and exchange of wealth, for it supplies a steady or fairly steady measure of values, and means of exchanging them. Trade without it would be barter, merely, and obstructed at every point by its own cumbrous system.

These promised conditions, almost accomplished, are not more cause for felicitation on material achievements than for the extension of American ideals and universal in-

telligence—the uplifting of humanity, the subjection of wrong for the right, justice and freedom for injustice and oppression.

Within the brief period of my observation, the increase of mineral products in the United States has been so great as to tax, almost pass, the credulity of even a native-born citizen.

In 1850 the coal product (I give approximate figures) was 7,000,000 tons; pig iron less than 1,000,000; copper 650, lead 35,000, silver in quantities was unknown, unsuspected, and prior to the California discovery, gold in very small quantities, and tentatively, had been mined in the South.

The gold mines on the Pacific Coast aroused the world to the new era. This discovery was soon followed by the opening of the marvelous silver mines in Nevada; then gold, lead, silver, copper, iron and coal mines succeeded in amazing numbers and products all over the West, especially in the Pacific and intermountain states; and the Michigan copper and iron, and the enormous coal beds in Pennsylvania and the “Old West;” lastly Alaska.

It was bewildering to the men striving to keep abreast of the times.

From the records it can safely be stated that the present annual product of the leading ores in the United States is:

Coal, 225,000,000 tons; iron, 80,000,000 tons; copper, 270,000 tons; lead, 210,000 tons; zinc, 120,000 tons.

In addition to these are immense products of salt, cinnabar and other minerals in great variety.

Petroleum is produced here to the amount of 2,500,000,000 gallons annually.

The annual product of silver in the United States amounts to about \$55,000,000 in value, and that of gold \$80,000,000, greatly exceeding, as before stated, the product of any other nation.

This record of things accomplished has no parallel. The results to flow from its continuance defies prophecy; the probabilities are beyond computation and the possibilities world-arousing and portentous.

To bring these vast amounts of minerals to the surface more than a half million men have daily employment. To feed and supply them and to transport and reduce the ores to metallic state, and to manufacture large portions into all the forms for uses to which they are adapted requires the daily work of several millions of men, women and children.

The little company of prospectors whom I first saw on their way to Galena, in my native state, to sink "sucker" holes for lead, has grown to mighty communities, sufficient in numbers and strength to found and maintain a nation.

I have been at some trouble to verify, approximately, my recollection of the achievements of fifty-four years, for the purpose of emphasizing an argument for what seems to me to be a necessity—the creation of a department of government (a cabinet office perhaps) to be charged with the special duties of promoting and protecting this most important industry.

Here I desire to express my most cordial approval of what your President has said on the need of obtaining the recognition and co-operation of the United States for the furtherance of this great industry. Government, of course, is not asked to take charge of it, but to adopt means for promotion of it—the same as in commerce and agriculture.

Every citizen—every child—of this Republic, is brought into daily contact with the use of the products of the mines. Those products are distributed to every part of the globe where civilization is.

Certainly, an industry engaged in exploiting such large areas and producing such enormous values as profoundly to affect state and foreign commerce and become potential in influence upon National and international policies, merits the gravest attention of our Government.

Through it, if at all, this Nation can successfully attain its highest standard and influence in the world. So long as this people can control, as at present, the price of copper, iron and coal, and be dominant in the production and potential in the movements of the money metal, it will become and remain foremost among the nations.

Though I have given some figures, just now, it is not my



intention to enter into a close or extended statistical statement of the mines of the country and of their products. My object is briefly to advert to the effect that the mining industry has exerted, and will exert, more and more, upon the destiny of the human race.

The history of civilization is largely the history of the development of industries. Property is one of the foundations of organized society, as human character is the other. Primitive man lived by the chase, aided by rudest agriculture, and, later, though not in the Western Hemisphere, by flocks and herds. It was the smelting of ores, the extraction and use of metals, that added to his primitive life the forces that have produced a complex industrial civilization.

The condition of man in America, at the time of the discovery by Europeans, was due to physical causes that belonged entirely to the New World. It is one of the illustrations which prove in most striking ways that the general course of history is ultimately controlled by physical causes. Man in America was making no progress. He had not the use of metals. The use of metals he had not acquired because his subsistence was the chase, and agriculture in the lowest state, and, lacking the aid of the horse and of the ox, he could not enter on an extended system of agriculture nor lay up store of food. Mining and the working of metals require storehouses of cereal food, and domestic animals for meat supply, as well as for heavy labor. Till a people can reach these conditions they can have no time to spare from the search for scanty food. So the American Indian, never, probably, would have made any progress beyond the condition in which the European found him.

Mining is hazardous, or more hazardous than other undertakings, only when pursued blindly, without special knowledge or judgment. In any line of effort one who is to succeed must have the special knowledge which that line requires. But, as mining may yield greater gains, so the risk is greater. Hence, more need in this industry of special knowledge and cautionary judgment.

In some ways it is a risky business, but on these principles, the risk may be minimized. The tendency of this

pursuit, especially of the search for the precious metals, is at first to attract a restless and adventurous population, whose disregard of conventional restraint and lessons for experience leads to the assumptions of risks and of bold and adventurous undertakings, by which, however, new countries are rapidly opened up to settlement and to civilization. But the nature of things in a short time so ordains it that the superficial treasures of the earth, designed to attract this superficial class, soon disappear, and a higher order of intelligence is required and a more permanent condition of things is established. This is the universal history of our mining districts, especially of those whose products are gold and silver. Surface mining disappears, and deep mining, requiring capital, special knowledge and skill, follows it.

The movements of civilization depend, mainly, and always, on the products of the mines of the earth. Till ores could be smelted and metals could be had in quantities for the use of man, progress was practically impossible. Even production of food, from agriculture, in sufficient abundance to meet human wants, had to wait on production of iron, and again on production of iron and steel for its distribution and carriage to the market. Again, the dependence has been as great on the money metals as media of exchange. The most careless thought will recognize at once how great a place mining industry has among the means which have contributed to the progress of the human race. It is not too much to say that this industry has been, is, and ever will be, the indispensable basis of civilization and of human progress. Conceive the world deprived of the products of its mines, and everything else becomes inconceivable. You have then the conditions of man's primitive life, when he was thrown into the world with no means in his hand of subduing the forces of nature and of making earth or elements serve him.

For in every situation man is dependent on the resources of Nature, and his advancement depends on the measures of his success in utilizing them. The struggle upward has been hard; for some accumulation of the supply of

food was necessary before labor could be withdrawn from the necessities of the passing day, so that mining could be pursued and metals extracted. Production of metals, therefore, was slow, and as agriculture is so dependent on metals, agricultural progress was slow, too. In America, at the discovery, the stick hardened and sharpened by fire was the best implement of agriculture.

So, as the artificial production of food, in quantities to relieve natural scarcity, is the first step to human progress, the second one is as great in itself and greater in its vast and varied results, namely, the complete transformation of human society through the opening of mines and the extraction and use of metals. Of the first step of this change, in the substitution of an artificial for a natural basis of subsistence—which over the eastern world, in times more or less remote, silently shifted the foundations of human society, or rather made the conditions of the change, the written chronicles have little account to give. The second step, and its results, are nearer our own time, and the record is ample, for though we do not know when iron was first smelted, we do know that within a very recent period the increased production of iron, later in the form of steel, has wrought almost complete transformation of the artificial structure called civilized life, and the change has been accelerated and augmented by the production of vast quantities of other metals—copper perhaps coming next in importance in the industrial world; and gold and silver, indispensable as metals in commercial exchange. And to crown all, coal, indispensable source, through combustion, of motive power—transformable and transferable through steam and electro-dynamics, into working force of infinite extent, for all the uses of man.

The function of machinery in this whole work is immense, and machinery depends on mines and ores and metals, and coal to operate it. So, without the products of the mines—were it conceivable they should be suspended—the world would stand still. It would lapse or sink to the primitive conditions of life from which the mines and the metals delivered it.



And transportation, or means of transport, application of power, through machinery, for facility and rapidity of movement, for carriage of freight and for speed and comfort of travel, by which the present age is specially distinguished above all that has preceded it, are functions of human activity which have produced upon the world greatest of all effects ever witnessed within the history of man. It is through development of this activity and its consequent influence that national and international intercourse have been established. Thus the play and influence of nation upon nation, of race upon race, stimulate the energies and promote the progress of all. Through this movement not only the race of men, but the earth itself is subjected to profound modification, leading to improvement in no other way attainable. It was not till the age of mining, of coal, of metals, that this could be realized—transport and travel with speed, and cheaply, by land and by sea. So men in our day, as in the old poet's conception of the messengers of God, are able to "post o'er land and ocean without rest."

I need say no more. The subject is vast and infinite, and I can present merely an outline, suggesting the relations of the mining industry of the world to the progress of the human race. It is not all, indeed, but it is the greatest of all factors; for of the infinite development that has transformed all human society it is the principal agent and main support. It not only supports itself, but it stimulates every other energy. It is the main agency which has produced that infinite variation which gives to modern life the character that so distinguishes it from the life of the earlier time.

## The Public Land Commission.

BY MR. F. H. NEWELL, CHIEF OF THE RECLAMATION SERVICE.

MR. F. H. NEWELL: Mr. President and Gentlemen: It is with great pleasure that I have the honor of appearing before this distinguished body, representing, as it does, mining, one of the greatest interests of the United States.

As your President has said, Mr. Pinchot and I appear here under instructions from the President of the United States and as members of the Public Land Commission, consisting of Governor Richards of Wyoming, the Commissioner of the General Land Office, as chairman, of Mr. Gifford Pinchot, the Forester of the Department of Agriculture, and myself, constituting a commission of three persons, to consider and report to the President upon the present administration and desirable changes of the land laws.

Now, you gentlemen interested in mining have, of course, a very vital concern with the present land laws and their administration; and although these do not touch you, perhaps, on as many points as they do some other interests, yet there are certain laws enacted by Congress, with which you have more or less to do, and doubtless a number of you have very definite ideas and suggestions which you might make as to the administration of these laws and the changes which might be beneficial for the development of the mining industry.

There has been, as we are all aware, much discussion as to the wisdom of the law governing the apex and of the decisions which follow it, and if we should open this subject for discussion I imagine there would be a great difference of opinion here as to the benefits to the country of following vertical lines or of following the vein. On that point the commission would be glad to have suggestions and advice, as the proper solution of that point will render great benefit to the mining business, putting it on a safe basis, and make it easier for you men, engaged in the development of the country, to carry on your business safely and economically.

I can not take the time now to go into a discussion of these matters, even if it were proper to do so. The point that I wish to make is, that we, as members of the commission, would be very glad for any suggestions, written or oral, which would tend to guide or assist us in making, in the future, some definite recommendations to the President, which he in turn may transmit to the Congress of the United States.

Mr. Pinchot and I also appear before you in another capacity, viz., each as the head of a division or bureau of an important work of the Government. Mr. Pinchot, as the Chief Forester, will speak upon forestry, and I will claim your attention for a few moments in regard to another and co-ordinate piece of work, that of the reclamation of the arid lands.

Now, it may not be obvious at first as to what connection there is between irrigation and mining, but all of you appreciate that the best part of our mining industry, at least a considerable part of it, of the precious metals, is in the arid West, where water is the foundation of all values, except mineral, and of all life and industry. The conservation of the water supply, the bringing in of a population, the building up of agriculture and allied industries, all have a very direct and vital bearing upon your business.

It may be said in general terms that irrigation in the arid West is an outgrowth of the mining industry, especially of the hydraulic mining. As you are all aware, many of the old hydraulic flumes and ditches built in California and on the Pacific Coast have been gradually converted into great irrigation systems, because the use of those flumes and hydraulic works has not been profitable for placer mining. Many of the large and important irrigation systems of California have been the natural outgrowth of the work done by the miner. In other words, the miner has not only been the pioneer, has furnished the market, has cleared the way, but his very works have contributed to the agricultural development of the country, and in return it is hoped and believed that the hydraulic works built for agri-



culture and from which power will be developed, will be of use directly and indirectly to the whole mining fraternity.

As you are probably aware, by the law of June 17, 1902, the proceeds from the disposal of public lands in all our western states and territories—thirteen states and three territories—has been set aside for the construction of works of reclamation for the building of large dams and reservoirs and canals for holding the waters and distributing them to the arid land. Those works, built in the high mountains, in or adjacent to the forest reserves within the mining country, frequently will have very direct bearing upon many industries, and the creation of water power which will follow the building of these works will probably afford the means for the transmission and utilization of a cheap power extremely valuable to you in every way in operating and lighting the mines. It is only a few days ago that I had the pleasure of going into one of the largest mines in northern Idaho, lighted throughout by electricity, transmitted forty or fifty miles; and the contrast to the old, dark, gloomy holes of the past where you could barely make your way with a candle is striking to one who occasionally visits those great works.

In conclusion, I wish to repeat to you that we, as members of the Public Land Commission, wish advice and suggestions from you; and as the chief of the Reclamation Service, I wish to aid and co-operate with you and with the mining men in every possible way in large works which are to be built by the Government for the development of the West.

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MR. GIFFORD PINCHOT: Mr. President, Ladies and Gentlemen: Mr. Newell has spoken to you of the Public Land Commission, of which he and I are members. I want to say just a word about that.

The fundamental idea that the President had in mind when he created this commission was to get at the best use of the public lands, of all the public lands, an idea which originated with him in its present form, and which he has done more than any one else to put into effect. We were

asked then to investigate and say how each part of the public domain can be best used, and Mr. Newell has told you how pleased we shall be to hear from you as to any improvements in laws or practice that can be made to improve and further the use of the public domain for the miner.

Now, I have come in contact with public land questions mainly on the forestry side, and the question there has arisen continually, daily, How can we give the forested part of the public lands their best use for every part of the community? We have taken up this matter from the point of view of the lumbermen, and there we find that the essential thing is to keep up the timber supply. In other words, the object of the forester is not to preserve trees and destroy the lumber industry, but to preserve trees and preserve the lumber industry by doing it, cutting the right trees and letting the young ones come on. We have taken it up from the point of view of the grazing man, the live stock man. What can you do with the forested lands to give their best use to him? The answer is, make the range and the forest available in such a way as to prevent its destruction, and make the grass resource a permanent resource. And so on with the other great interests which are concerned with the forests. We have most to do with regard to water supply, and you gentlemen are very intimately connected with that, to keep the water coming from the forested hills, preventing, so far as we can, high floods at one time and too low water at another.

As to the mining industry, I approach there a question which has been very largely misunderstood at first among the miners in different parts of the United States, and latterly, I am very glad to say is much better grasped because the mining people have come in contact with forest reserves. You know when any new subject comes before the great body of people there arise at first mists and misunderstandings which are gradually cleared away as the thought comes in contact with the individual mind. When the Black Hills Forest Reserve was created, there was an impression among the mining men there that they were all going to be driven out, that that was the end of the devel-

opment of the hills, that the ranches must go, that the miners must go, and they used to come down to the railroad train wrapped in blankets and yelling like Indians, to indicate that they had something to say on the subject. They have seen what the actual facts were, and the people of no community in the United States stand more solidly behind the forest reserve policy than the mining men of the Black Hills. The reason is obvious. You can not run a mine without timber. Many mines can not run without water. Now, there may be plenty of timber over a range, but if it can not be gotten to your mine cheaply enough, it is of no more good to you than if it were not there. The object, then, of the forest reserve policy of the Government with relation to the mining man is to keep timber enough in his country, keep it growing in his country, to make it possible for him to run his mine at a profit. Let me say in a word how that is done. In the first place, the Government's policy definitely is to protect and promote local industries as against industries at a distance. That means that we should prefer to have the timber cut and used in the country instead of being sent out of the country for use somewhere else. Secondly, we want to keep the fires out. I was told just the other day by a gentleman whom I see before me, that many times the amount of timber used is burned in northern Idaho every year, and every bit of it that is burned means a loss to the mineral industry of that country either now or within a few years. Forest protection keeps the timber from being burned and saves it for mining use, all of which is unquestionably good, and when those facts are understood we have no complaint from any mining man on those two points.

But let me return for a moment to the misconception of which I spoke. There has been an idea that prospecting was not allowed in forest reserves, that timber could not be used, and that in general the organization of the service was such as to make it hostile instead of friendly. I want to read to you just a paragraph or two from the law on that subject. The law provides: "That any mineral lands in any forest reservation which have been or which may be



shown to be such and subject to entry under the existing mining laws of the United States and the rules and regulations applying thereto shall continue to be subject to such location and entry, notwithstanding the reservation."

That nails that point. You can prospect, locate and develop mines in a forest reserve, the same as you can outside.

Can you use the timber? Here is what the law says on that point:

"For the purpose of preserving the living and growing timber and promoting the younger growth on forest reserves, the Secretary of the Interior, under such rules and regulations as he may prescribe, may cause to be designated and appraised so much of the dead, matured or large growth of trees found upon such reservation as may be consistent with the utilization of the forests thereof, and may sell the same for not less than the appraised value in such quantities and to such purchaser as he may prescribe, to be used in the state or territory in which such reservation may be situated respectively, and not for export therefrom."

That is where the sale of timber is authorized. You have prospecting authorized, development of mines authorized and a supply of timber provided for, and at the same time have forest protection and conservation of the water supply. I insist on that point because of a misunderstanding which at times has occurred. Being connected with the forest reserve work, I have received a great many complaints at different times of the red tape, which obscures the operation of these laws and prevents them from being as useful to the mining man as they would otherwise be, and I am obliged to admit frankly that there is just complaint, on those grounds, that there has been too much red tape; and also, I want to say, the Government being aware of that fact and taking steps to prevent it, the chances are there will be very much less of it in the future. The pre-eminent thing is the protection of timber everywhere, which is the occasion of this red tape, and the resolution which was read to you just now is designed to do away with the delays, which are the most serious things in this connec-

tion. The Government understands just as well as you do that when a mining man has got to have timber to keep open his workings, he has got to have it; he has got to have it right away, and there should be just as little delay as possible. Now, what happens under the present management when a mining man sends in an application for timber in a forest reserve? What happens because of this separation of the Government's forest work into three parts as it is now, in the Geological Survey, the General Land Office, and the Department of Agriculture? Suppose you write to the Secretary of the Interior for some timber. He sends that application out to the supervisor. The supervisor ought to have power himself, but he has no power to-day. The supervisor makes a report on it; he sends it back to the Commissioner of the General Land Office; the Commissioner of the Land Office sends it to the Secretary of the Interior; the Secretary of the Interior sends it to the Secretary of Agriculture; the Secretary of Agriculture sends it to the Bureau of Forestry for an expert opinion as to whether or not that timber ought to be cut. When the Bureau of Forestry says it ought to be cut, it goes back to the Secretary of Agriculture, from the Secretary of Agriculture to the Secretary of the Interior, from the Secretary of the Interior to the Commissioner of the Land Office, from the Commissioner of the Land Office to the division in the Land Office, which has charge of forest reserves of that division, to the Supervisor, and finally the mining man gets his fingers on it again. Now, we are trying to do away with all of that sort of thing and handle this matter in a business-like, direct way, just as any business man would manage his own business. But, I want you to remember that red tape, under our system of Government, is the temporary thing and is going to be wiped out; that the permanent thing is the great advantage of the permanent timber supply, permanent water supply, local use of the available timber and such matters as that. It is very hard, I know, when a man is bothered with things of that sort not to have the thing that bothers him removed so that he can go back to his

place in his mine, but it is the greater permanent benefit that underlies it.

I want to add one thing more. Mr. Newell has spoken, as I have said, about the desire we have to get information on public land laws from you, as to how they can be improved for your use. Now, I shall be equally glad on the other side to get any suggestions which you are kind enough to make as to how the working of the forest reserves can be improved from the mining man's standpoint.

I thank you very much.

MR. HARRY S. JOSEPH (of Utah): The other day, in going into one of your forest reserves in the eastern part of Idaho, bordering on Wyoming, I saw vast areas of what would be very good agricultural land included in the forest reserve. I would like to ask whether it is the purpose of the Government to plant that with trees for timber.

MR. GIFFORD PINCHOT: I am glad you asked that question. The Government's purpose about agricultural land in forest reserves is two-fold. In the first place, not to put into forest reserves agricultural land where it is possible to keep it out; and, secondly, even if it is in, to make it open to entry; and the commission which I have the honor to be a member of has made a report to the President, and a bill has been introduced in Congress, which will undoubtedly pass at this next session, making all agricultural lands in forest reserves open to agricultural entry. It is a great deal better to raise grain on land than to raise trees, but when we can not raise grain, then let us have trees.

MR. T. A. RICKARD (of New York): Gentlemen: I have no speech or address to make, but I am glad to have the opportunity of expressing my appreciation of the honor of being a national delegate to this Congress, and at the same time I may tender the apologies of Mr. James Gately and Mr. Hammond for their inability to be here. Mr. Gately at the very last minute found it necessary to remain in New York in connection with some very important experiments in the metallurgy of iron which he is carrying on, and Mr. Hammond sends a telegram that he has been somewhat overwhelmed of late and crowded with work so



that he could not make it possible to make this journey and attend this Congress. However, gentlemen, I hope you will appreciate my interest in the doings of this Congress by the three thousand miles which I have traveled to come from New York here.

New York, it occurs to me, is somewhat of a mining centre, not in a financial sense, as most of you are aware, but in a practical sense. I have seen more mining in New York City during the last two years every day than I have seen anywhere else. I refer to the Subway. There are more men, and there is more capital represented in the digging of the great system of tunnels under New York City, than is represented by the activities of a large mining region. And to any of you who are there as miners, it will appear to you remarkable that all of this work should be going on underneath and in the heart of a great city with so little interruption of the traffic.

I may say in all sincerity that I have listened to the speeches at this Congress with great interest, and particularly to the address of the President. I can say, too, in all sincerity, that if your spirit is as earnest and if you are as sincere in your purpose to get what you want as is evidenced by the speech of your President, you will win, and I hope you will. There is no question in my own mind, as one who has been connected with mining in a practical way as an engineer long before I was an editor, that the mining industry does need some means through which it can make its wants known. Mining men, as a rule, do not maintain very close relations with their congressional representatives, and for that reason, perhaps, they do not exercise as much influence at Washington as the output of their activities warrant; and a Congress like this can put into concrete shape the desires and the requirements of a great industry. I hope that in your agitation for a mining department—which has been voiced and carried in the resolution this morning, an agitation which I hope will be successful—that you will then take up other matters. For instance, the control of mining companies in some such way as to make illegitimate mining more expensive and more difficult and

to make legitimate mining more easy. I hope, also, that you will pay some regard to the anomalies of the mining law. A resolution pertaining to that matter has been brought before the committee. But that is only one of a great number of difficult problems which have come before us mining men as a consequence of the early mistakes of the mining law. I hope, gentlemen, therefore, that you will be successful in your work. I believe from what I have seen here, that you have a sufficient number of earnest, purposeful men to do good work, and I hope that your efforts will redound to the greater benefit of an industry which is one of the most beneficent known to a busy humanity.

## Idaho and Thunder Mountain.

BY A. E. BORTHWICK, BOISE, IDAHO.

Idaho is a state having great mineral resources. A few leaves only of the book Nature has so lavishly enriched have been turned. Enough development has been made, however, to show that when the "Gem of the Mountains" comes to her own her record of gold production will rank along with California and Colorado. As a silver producer she will be a peer with Nevada of old, and Montana and Utah of the present. In her production of lead she now outranks them all. When the development of her copper deposits in the Seven Devils, North Fork of Clearwater, Big Creek and Custer countries are commensurate with their richness, she will vie with Arizona and Sonora in actual production. A large part of the state is still as Nature left it thousands of years ago, without roads, trails or inhabitants, the surface covered with forests and grass, peopled by the wild animals, awaiting the genius of man to fill her woody fastnesses with the sound of the mill whistle, the hum of the town and the roar of the stamp mill.

Seventeen out of her twenty-one counties are producers of the precious metals.

I have not at hand the reports since 1902, but in that year the value of her gold was \$2,467,233; of silver \$6,784,113; of lead \$4,172,805; aggregating \$13,424,151.

The production of the Coeur de Alene silver-lead mines in 1903 swelled the total production to over \$20,000,000.

The Coeur de Alene mines are wonderfully rich, and the management of some of her principal mines are doing development work looking to continuous and increasing production for twenty-five and thirty years.

The Bunker Hill and Sullivan Company have completed a tunnel over two miles in length through which an electric railway brings the ore from its stopes to the concentrator. Stopes seventy feet wide, carrying pay ore, are talked of.



The Morning mine at Mullen has had a 13,000 foot tunnel under way for over three years, designed to tap the ore body at great depth.

The Hercules mine near Burke, was developed by a group of resident miners and when the ore body was struck in going 1,600 feet it was found to be so vast and rich that the company has for the past two years or more been paying about \$40,000 per month in shipping the high grade ores direct from the mines to the eastern smelters.

Owyhee and Boise counties are the present principal producers of gold with a credit of above a million.

The production of the placers of Boise basin commenced in the early '60's, still continues.

Best authorities give a total production of \$150,000,000, and there is much ground as yet untouched.

The early history of the production of War Eagle and South mountain, in Owyhee, has been exceeded by the later yields of Teloride mountain and De Lamar.

To even name all of the districts and famous mines would make a long list.

For full and complete report on the mines of Idaho your attention is especially called to the able and scientific report of Mr. Bell, state mine inspector, which was read by title and will be embodied in the proceedings of the Congress.

As a sample of some of the wonderful riches the state contains, a brief description of one district is here given:

Through the operations of a short mining boom in 1901-02, Thunder mountain has become known all over the country from Maine to Oregon as a remote mining locality in central Idaho. In some places, no doubt, the opinion is held that it is a good place to stay away from.

Thunder mountain lies a little south of the 45th parallel of latitude, and almost on the 115th Western meridian line. The mining district of that name comprises the country around it for perhaps thirty miles in every direction. No surveys have been made, and few maps indicate the exact locality. The district is new, very large, and, judging from the comparatively small amount of development work

done thus far, is very rich. It is situated on the top lines of the watershed draining northerly into the Salmon river. The altitude is not as high as Cripple Creek and many rich camps in Colorado. None of the higher peaks reach quite 10,000 feet; the general average of the ridges being from 7,500 to 8,500 feet.

The country is very rugged and the mountain sides steep. Slide rock is common.

In no direction is there scarcity of wood or water. Grass is plentiful in its season. There are large areas of burned timber, but generally there is abundance of timber. Valleys are narrow; seldom a quarter of a mile wide. Winter is long, but not severe. The thermometer showed 16 degrees below zero once last winter; a number of times it was 10 degrees and 12 degrees below zero. Snow commences to come from November 10th to 20th., and is three feet deep on the bottoms, to six and eight feet on the ridges. It is off the southern slopes in April, and grass starts at once. May 1st shows the creek bottoms bare of snow and blooming.

The placer mining operations of the Caswells, with the subsequent sale of their holdings on Thunder mountain to Colonel Dewey, of Nampa, Idaho, followed by energetic operations, started the mining boom in 1901-02. Thousands went in and claims were staked covering the porphyry field for nearly twenty miles in all directions. Of the thousands who went in, a few hundred saw the probable future wealth to be had and remained. Of the thousands of claims that were staked and recorded a few groups have been developed, enough to indicate the ultimate richness and greatness of the district.

In the narrow valley of Monumental creek, at the mouth of Mule creek which drains the Dewey property, and about midway between Thunder mountain and Rainbow peak, a town was started, named Roosevelt: To the West the nearest wagon road was seventy miles, and to the South eighty-five miles.

As prospecting went on it was found that much of the surface porphyry which covers a large part of the territory, was either barren or yielded but a small amount of

gold, also that in a marked degree there was an absence of ledges or veins or walls which the prospector considered essential to ore production. In some places the surface rock would show colors in panning, and the earth on some of the higher hills would exhibit a generous streak of yellow to those who took the trouble to carry the dirt to water. Usually there was little systematic work done, and a few days, or weeks, at most, brought a reversal of sentiment and the average gold hunter and rainbow chaser had left the country before the winter of 1902, reporting it "no good."

Last year saw a continuation of the development with good results in every instance where the work was intelligent and careful, and sufficient to place it beyond the assessment condition.

The main porphyry field extends from the top of White Pass, six miles south of Roosevelt, on both sides of Monumental creek, to the mouth of Holy Terror creek six miles below the town, and includes Thunder mountain and Rainbow peak, with one or both slopes of Marble and Cottonwood creeks on the East and South, Sugar and Tamarac creeks to the West of Rainbow, the West Fork, and well up Snow Slide ridge to the North. This embraces in the main area a tract about twelve miles square, of which fully twenty-five per cent. (and I think more) is porphyry or quartz-porphyry. There are other small porphyry fields down Monumental, Marble and other creeks.

Within the area described extensive development has been done on less than a dozen properties, The Sunnyside company on the slope of Thunder mountain has pursued a plan of development wise, careful and systematic, that has been productive of remarkable results. Within about two years, by working perhaps an average of twenty-five men, its superintendent gave in December last a conservative estimate that there was fully 500,000 tons of ore in sight that will mill from \$7.00 to \$10.00 per ton. This company is now working 250 men and is installing a forty-stamp mill with overhead tramway about a mile long, and will soon be a producer of bullion. The cost of mining and milling is estimated at below \$1.75 per ton.



The Dewey has done even more development work. After milling ore all winter with its ten-stamp mill, having no delay or annoyance from ice or snow, it closed down April 1st, from shortage of wood supply. Its March run produced more than \$20,000 gold bullion from its batteries and plates.

The H. Y. management commenced development on the southwest slope of Thunder mountain after acquiring the property last fall, and this spring in the face of its tunnels after going 200 and 300 feet got values from \$50.00 to \$70.00 per ton. While in the whole length of the tunnels the values had averaged \$4.00 to \$6.00 per ton.

It will take many years to tell the story of the extent of the pay ore bodies.

The above are samples of what has been found on partial development. In such a large field showing relative sameness of surface values, where commencement of tunnel work is determined by the relative steepness rather than by any superior surface showing, it is not likely that the present developments include all the good ore bodies that will be uncovered. It is the general expression of those conversant with the conditions, that the present companies' great finds will be duplicated by many others, and even richer fields opened as the work of exploration goes forward.

The developments on Rainbow peak have not been so extensive as those on Thunder mountain proper, but the Fairview developed a dike about forty feet wide, nearly 3,000 feet in length which is reported to average above \$8.00 per ton, free milling. The Toronto, Gold King, First National, Tripod and others are finding good ore values as the work progresses. Very good values are reported on Sugar creek and Tamarac creek to the west of Rainbow, also on Divide, Coney, Four Mile, Lava, Cornish and Cottonwood creeks south of the Monumental and Thunder mountain, and on Trap, Rainbow, Botha, Bonanza, Sable and southwest fork of Monumental to the north of that stream. Active developments are being made on Big and Little Indian, Marble, Holy Terror, Deer and Rush creeks, with satisfactory results.

The Big Creek district to the northwest is another rich field, receiving much attention, and showing great ledges of free and base ore of remarkable size and richness.

Following are expert opinions:

Hon. M. H. Jacobs, ex-state mine inspector, who has frequently visited the district, says—"The time has gone by when anybody of however doubtful a nature he may be, can say that the mines in and about Thunder mountain are not going to make great producers."

Professor D. H. Mead in a report to the Oregon Short Line Railway Company, says in part—"In reply to your question as to what were my impressions of Thunder mountain, will say that it is an immense reef of rhyolite, porphyry and breccia, averaging \$6.50 per ton, in such great quantities that in the short time I was there it was impossible to estimate extent."

This relates to the Dewey property which at present is the only mine where any great development is being done, but enough ore shows to keep a hundred-stamp mill going indefinitely. When properly equipped ore can be literally quarried out on the same principle as the Homestake in the Black hills and Treadwell mines of Alaska. An unlimited electric power can be developed on Monumental creek, a distance of eight miles from the mines. Timber and water are in abundance. The formation of the ore is principally porphyry-rhyolite-trachyte and phonolite.

William Allen White says—"Gold mines and gold prospects on Thunder mountain proper are located in porphyry reefs and intrusive dikes of talc. These reefs and dikes occur in steep dust-covered hills, soft in outline and about 3,000 feet above the gulches about them. The ores are found free in porphyry or talc, with little quartz and few crystals. It is a comparatively low grade ore, but is found in large streaks and pockets, and seems to be running richer in values as the tunnels go in, for the gold appears to be coming from below rather than to be a sedimentary deposit."

Professor E. J. Conroy of Boise, Idaho, says—"Thunder mountain is a vast area of porphyritical upheaval. The soft

rocks of this formation have been scored to great depths by streams draining this wide area, and the sides of the canons are very precipitous. It would seem that the whole area was a lake bed, and some violent convulsion of nature caused this vast upheaval of porphyry, that the subsidence occurred immediately before the waters had receded, and that gold had been disseminated along the strike of the vast dikes of porphyry, enriching areas of the uplifted rocks."

William E. L. Hame says—"I consider the formation identical with that of Cripple Creek. It consists of rhyolite, intersected by phonolitic intrusions. The greatest values are met with at the contact of the dike with the overlaying volcanic breccia."

I quote from report of Charles Raymond, M. E., of Chicago—"One remarkable feature in regard to the Thunder mountain district is that the ore bodies throughout the district are identical. In other districts ore is found in many different forms. While work has been carried on in some of the leading properties to the depth of over 200 feet, and cross-cut tunnels run in opposite directions, no well defined walls have yet been encountered, going to prove the assertion often made that Thunder mountain is one vast mountain of ore."

These gentlemen reported their findings eighteen months to two years ago.

J. M. Venable, a well-known mining superintendent, who has spent much time in the Thunder mountain district, and given careful attention to the occurrence of ore bodies there, holds that the veins do not crop their course, being simply indicated by changed conditions of the rhyolite or porphyry. Where the rhyolite or porphyry shows quartz crystals, some gold is met with, and at all such points where the surface rock has been cut through, ore bodies have been found.

Professor E. M. Ray, former superintendent of Stratton's Independence mine at Cripple Creek, Colorado, says in part in a recent interview in the Idaho Statesman, July 14th, after his third visit to the camp—"The development assures the camp a place among the richest in the country.



I feel justified in saying so much as that, and I might add that in my opinion the district is likely in two or three years to be better than Cripple Creek is or has been."

Of the general mass of porphyry, Mr. Ray said—"It averages higher than the ore of the Treadwell mine. I have taken a great many samples and find the average somewhere between \$2.75 and \$3.50. It is absolutely free milling and can all be handled at a good profit with sufficient milling capacity.

"The great feature of the camp next to the size of the ore bodies," Mr. Ray continued, "is that the ore is absolutely free milling. Plates only are needed. You do not have to have concentrating machinery or anything else beyond the batteries and plates. There is no base in the ore, and the values can all be saved by simple amalgamation."

More than likely the great mass of ores are as described by Professor Ray. There are some sulphides, however, in the mysterious Slide group adjoining the Dewey, and in the tunnel of the Dakota claim of the H. Y. group.

Lack of transportation has been a serious handicap in development of the district. With nearly one hundred miles of rough trails over which everything had to be packed, costing from six cents to ten cents per pound, it took a rich country to justify the expense of even surface prospecting.

The completion of the wagon road now assured will revolutionize former conditions, enabling the Thunder mountain country to be easily reached about every month of the year and contribute largely toward opening an era of prosperity there, whose benefits will be lasting and far-reaching.

## Address.

BY MR. ELLIS H. ROBERTS, DIRECTOR UNITED STATES MINT.

I shall detain you only a moment. I am here merely as a casual, though interested, spectator. I stopped off to spend a day, and to extend a word of greeting and good will to this convention. (Applause.) I am just returning from a short tour in what I anticipate will become one of the most important mining districts in the world—Alaska. (Applause.) The hidden and marvelous richness of that country have but recently been revealed only in part, and in my judgment are now only faintly appreciated; but from this time on developments may be expected year by year. Thousands of hardy prospectors are scattered over Alaska with pick and shovel and pan, and in spite of almost inconceivable obstacles and hardships, are opening an empire of mineral resources. I have a good notion to put Alaska in nomination for permanent headquarters of the American Mining Congress. (Enthusiastic applause). I was pleased to observe that this body has cast its influence in favor of generous and just treatment for Alaska (great applause). I have never been predisposed to emphasize the value of government aid for this or that locality, or this or that interest; but I know an orphan when I see it, and I feel that Alaska has not had generous, or even just, treatment at the hands of the general government. (Great applause).

Now, gentlemen, I simply wish to bid you God speed in your proceedings, and to express my hope that the results of the work of this organization may be of great value to the mining industry. I thank you for your attention. (Great applause).

## The Influence of Mining Men for Better Roads.

BY JAMES W. ABBOTT, SPECIAL AGENT ROCKY MOUNTAIN AND PACIFIC COAST DIVISION OF THE OFFICE OF PUBLIC ROAD INQUIRIES, U. S. DEPARTMENT OF AGRICULTURE.

While everyone in a general way recognizes the need for better roads, the enormous importance of the subject, as an economic question, is not yet fully comprehended.

A careful investigation of the statistics shows that the cost of transporting over common roads of the United States the products of the earth and soil exceeds the sum of one billion dollars per annum and is greater than the aggregate amount paid to all the railroads for transporting freight.

While I do not intend to repeat much of what I said in my address last year to the American Mining Congress, there are certain things which are so thoroughly of the very essence of this question that it can never be discussed in any of its phases without some reference being made to them.

The European nations awoke to a fairly clear conception of this question about a century ago. Roads built primarily from military necessity proved to be of such general and far-reaching value that a system of national highway improvement was entered upon both in England and on the continent. Strange as it may seem, the relative importance of properly constructed highways was better comprehended by the people generally of the United States a century ago than it is to-day. In 1802, upon the admission of Ohio into the Union a law was enacted by Congress setting aside five per cent. of the revenues from the sale of public lands in that state to build highways from the navigable waters of the eastern coast to and through Ohio, two per cent. to be used on roads without the state, and three per cent. on those within. Under this law about seven million dollars was appropriated and expended in building a great national high-



way which was known as the old Cumberland road. It extended from tidewater westerly across the Alleghany mountains through the states of Ohio, Indiana and Illinois, nearly to St. Louis. For hundreds of miles this road was built nearly in a straight line and constructed in a thoroughly substantial manner and after the most approved methods. Its counterpart does not exist in the United States to-day. It was the great artery of that time from the older states to the new farms and cities of the West and played a very important part in the growth of the country.

In Europe, after the railroad came, it and the common road developed together. The relative place and importance of each seemed there to be understood but in this country, with the development of our railway system, came neglect and disregard of the highways.

The panic of 1837 produced such financial stringency that Congress was compelled to retrench expenditures in all directions. It stopped appropriating money for national highways and that policy has never been resumed. For more than fifty years, the roads of the country were left, as a rule, to take care of themselves. As railroads multiplied and improved the common roads grew worse and worse.

It was not until the introduction of the bicycle that public attention was directed to the subject. The sufferings and tortures of draft animals were ignored. The losses were neglected. The derision which our muddy roads and thriftless ways excited in Europe failed to make any impression upon our national pride, but when men got astraddle of a two wheel vehicle and actually propelled it with their own legs, they discovered that something was radically wrong. By 1892 it was estimated that the number of bicycles in the United States had increased to a million and the power and influence of their organization, The League of American Wheelmen, became a tremendous national force. As a result of the agitation initiated by them, the office of Public Road Inquiries was established by Congress in 1893 as a division of the Department of Agriculture. Like all other divisions of that very useful depart-

ment of our government, its functions have always been purely educational.

Its first line of investigation was in the cost of wagon transportation in both Europe and America. From a comprehensive series of inquiries made in all parts of the United States, it was found that the average cost of hauling a ton one mile upon the common roads of this country was twenty-five cents. Through the reports of consuls in the principal cities of Europe, it was found that upon the improved roads there the cost was in the neighborhood of 10 cents per ton per mile. In other words, we in the United States were spending two and one-half times as much to haul over our common roads as it cost our European neighbors to haul over theirs.

The railroad corporations, long ago, came to understand that it was good business to cut down in every possible way the cost of railway transportation. In my address last year, I referred to a recent report of the Pennsylvania Central Railroad, which showed that that far-sighted and aggressive corporation had, during the lifetime of a single generation, cut down the cost of hauling freight over their road more than eighty per cent.

Slowly, but surely, the people of the United States are beginning to comprehend the magnitude of our annual loss under existing highway conditions and to consider what is to be done to improve them. The most distinct gain thus far made has been in a general recognition of the necessity for co-operation in bearing the burden of cost.

Roads cost money. The old theory was that each individual community must bear the entire cost of its roads. So long as that prevailed little progress could be made, but it is coming now to be generally understood that the prosperity which follows the building of improved roads is shared by every interest. The city shares with the country in everything that makes for general prosperity or general adversity.

We know that nothing stimulates industrial activity so certainly as the building of improved highways. This means better values for real estate, more traffic for the rail-

roads, more demand for manufactured goods, more employment for labor and more money for everybody. Where everyone benefits, everyone should contribute in fair and equitable ratio. The recognition of this principle has led to the establishment of highway commissions in each of the New England and middle States.

New Jersey was the first to try it. After the bitterest opposition and resistance for years, a law was finally passed appropriating a small sum of money from the state treasury to be expended under the direction of a highway commissioner whose office was created for the purpose. One of the conditions imposed was that for every dollar of state funds thus expended, the county and the district in which it was spent should contribute certain definite amounts.

The prophets of evil all predicted that the plan would fail; that the counties and districts would not contribute the proportion required by the law to entitle them to any of the state fund. Happily their prophesies were not realized. The plan met the approval of the people. At the next session of the Legislature the pressure for a larger appropriation was irresistible. New York and Massachusetts followed along the same lines and adopted a similar policy. Co-operation has been so satisfactory that the states in which this plan is practiced have increased their appropriations, but have been unable to keep up with the growing demands from the communities. Pennsylvania recently appropriated six million dollars of state funds to be used in this way. New York state is planning to issue bonds for \$50,000,000.

Co-operation has proven the key to the situation. The recognition of the fact that all are benefited by improved highways and that all should help to pay for them. During the past two years there has been a very rapidly growing popular demand that the general Government should come in as one of the factors contributing. Bills have been introduced into both houses of Congress providing for the appropriation of very considerable sums of money from the national treasury to be apportioned to the states on a basis of population and to be available when the states themselves



appropriate sums corresponding to their respective allotments. It has been freely predicted during the past few months by those in position to understand what the people wish that this principle of co-operation will soon be adopted as an important feature of national policy.

This principle of co-operation, now so firmly established and so rapidly spreading, is by no means limited to equitable distribution of cost. The office of public road inquiries has conducted its campaign of education in co-operation with all the forces which it could join for work in this great cause. The press, quick to recognize the people's needs, the railroad companies, which understood the relation of better roads to increased traffic, the machinery companies which build the tools for making roads, have joined hands in the propaganda. Commercial bodies all over the country are taking it up and bringing their influence to bear on officials and legislators. In such great representative gatherings as the American Mining Congress, the Trans-Mississippi Congress, the National Irrigation Congress, it is now one of the important subjects for deliberation.

But important as is this great economic question to the farmer, the manufacturer, the merchant and the railroad, is there any interest more vitally affected than mining? More than one-half of all the tonnage carried by water or rail comes from the mines. It is estimated that of the entire products of earth, soil or factory, which are sold in this country, at least ninety-five per cent. must somewhere between production and consumption pass over a common road. Upon the ordinary unimproved highway, as we have seen, it costs two and one-half times as much to haul in wagons as it costs on the improved roads of Europe, and that proportion has been found to hold good for our best roads in the United States.

All of us who have been interested in mining in the new camps of the West realize the distressing waste which has attended all the early periods in their history, while the roads were crude. We know that in greater or less degree these adverse conditions still prevail. It is hard to get money for road building and often harder still to get it

properly expended. The need is great for missionary work. It would be difficult to estimate the good which the mining men of this country could accomplish if each would earnestly do his best, as opportunity affords, to stimulate highway improvement. The men who compose this Mining Congress are leaders in the communities where they live and their influence is potent and far reaching.

The men who make the laws and those who execute them all, to some extent, come under that influence. The press which moulds public opinion listens attentively and respectfully to the views of the men who own and operate the mines.

Some of the things which are needed and which mining men can help to bring about are:

The establishment of a highway commission in every state and the adoption of the principle of co-operation.

The education of public sentiment to the point where it shall demand of every candidate for a legislative office that he be an ardent advocate of good roads.

A clearer general conception of the economic problems involved, so that it may be understood why a debt incurred for highway improvement really produces an asset and not a burden.

An earnest purpose in each locality to learn how to get best results for money expended and avoid wasting it.

A careful study of the convict question, so that his activities may be utilized in building highways, thus removing him from disastrous competition with free labor, and uplifting the convict himself morally and physically.

These are some ways in which all good citizens can aid the cause.

There is a line of research for which the technically trained mining man is specially fitted. Chemical and metallurgical investigations are going to reveal facts of practical value to the road builder. A good road has a hard, resilient surface which effectively withstands the pressure and abrasion of wagon wheels. Some day I believe we shall know how to take the common material of any locality, whether it be rock, sand, gravel or just ordinary soil, and readily

and cheaply make out of it a good road covering. Probably few investigators of metallurgical problems will have opportunity or inclination to devote their energies primarily to road questions, but an understanding of the need for more light on road material may give a significance to laboratory results which might otherwise pass unrecognized.

The miner gives us the iron to build our machinery, buildings, bridges and ships, the fuel that keeps us warm and furnishes the energy to drive the wheels of commerce, the copper that transmits from brain to brain around the world in countless messages that mysterious force that we call thought; he gives us the gold which measures the value of human effort and every material thing. Without the miner's aid we could never emerge at any point from the primitive condition of the savage. Isn't it entirely natural that we should look to him for help in solving our one great still unsolved industrial problem?



## The Promoter and His Place in Our Development.

BY E. BENJAMIN ANDREWS, CHANCELLOR OF THE UNIVERSITY OF NEBRASKA.

Mr. President and Gentlemen of the Congress:

When I noticed, as I did with pleasure, in the yesterday newspapers, that this noble Congress was opened with prayer, I thought how appropriate such an exercise was in view of the many relationships which might be cited between religion and the interest which calls us together. Probably the oldest notice of mining in all literature is in Holy Writ, that eloquent passage in the book of Job:

"Surely there is a vein for the silver and a place for the gold where they fine it. Iron is taken out of the earth and brass is molten out of the stone. . . . As for the earth, out of it cometh bread, and under it is turned up, as it were, fire. The stones of it are the place of sapphires, and it hath dust of gold. There is a path (down under the earth) which no fowl knoweth and which the vulture's eye hath not seen. The lion's whelps have not trodden it nor the fierce lion passed by it. He (the miner) putteth forth his hand upon the rock, he overturneth the mountains, by the roots. He cutteth out rivers among the rocks, and his eye seeth every precious thing. He bindeth the floods from overflowing, and the thing that is hid bringeth he forth to light."—Job, chapter 28.

In our day, so fine has grown the individualization of men's tasks, that promoting has become a profession no less than engineering or journalism. Like the poor, the promoter is ever with us; his presence is among the most familiar of facts.

Exactly what he does, however, the precise sort of activity he engages in to make him a promoter, is less well known. It will be worth while to describe the creature, and, if we can keep him quiet long enough, to photograph him, that we may see what he is like and what his habits are.

Quite generally speaking, the promoter is the man who,

acting in his own interest and not in the employ of another, finds out new ways or new fields for the probably profitable use of capital, and then gets people of means effectively interested in these promising chances. But you would be so far forth a promoter if you did but one of these things. Lesseps was a promoter in putting through the Suez canal, although the certainty of huge profit from such a canal was no new thought of his, but the commonplace observation of six thousand generations. On the other hand, though the promoter need not be, and usually is not, an inventor in the technical sense, like Eli Whitney or Tesla, his most important office lies in the discovery of opportunity rather than in the directing of financial attention to the opportunity. That steel would supplant wood and iron in a million uses, and do this permanently; that coal oil must be the common people's illuminant for years and years in every civilized country; that judicious combination, taking the place of competition, immensely cheapens production; and that price-control in a commodity is possible without dominating the entire output, were "promotory" insights of the first order.

Having ascertained how new money can probably be made, and having created and organized financial interest in his project on the part of wealth-owners willing to invest, the promoter also, as a rule, performs the various drudgery required to unite these investors and put them in possession and control of the proposition waiting to be exploited. If a new railway is proposed, he institutes the corporation, negotiates for the right of way, and performs all the other initial work that is necessary before the corporation can practically take over and begin utilizing the property. If a mining scheme is in view, he buys options on the land needing to be controlled. If the project involves or consists in the merging of independent industries or plants under one management, he secures present owners' agreements to enter the "combine" or sell thereto on such and such conditions.

Thus the outlines of the promoter's trade begin to become clear. He is the intermediary between capital and new investment chances created or discovered by him. He

may actually make some new invention, valuable for industry, and drum up financial interest therein. Edison has not, I believe, prospectussed any of his inventions with a view to placing them upon the market; but it is quite conceivable that he might have done so. Oftener promotership consists in inventing, or at any rate evolving for the market, improved methods of conducting business, as new forms of advertising or of bookkeeping, ways of dealing with help or material, or of getting goods to customers; in almost any one of which lines novelties might be introduced so momentous as to render a business practically a new thing. The getting up of a successful trust would illustrate, besides much else, this sort of promoting. Wide new applications of inventions afford fields for promotion efforts, as when the gas engine principle is availed of to propel road cars. A patent commonly finds its way into use only as some promoter takes hold of it. The extension of old industries to new fields is usually promoter's work, as the building of cotton mills in South Carolina and Georgia, and the starting of iron and steel manufactories in Alabama and Colorado. The putting of materials to new uses, as the substitution of oleomargarine for butter, and of cotton oil for olive oil, is frequently a form of promoting, and so is the opening, for any product, of new markets within the country or beyond the sea.

In every such case it is the promoter who espies the chance for gain, patiently calculates its possibilities, describes these so that others can see them as well as he; gets a "cinch" on them by the purchase of land options or other conditional promises; and then proceeds to enlist the needed money support, to organize this into a corporation, and to set the corporation on its feet working the bonanza.

It will render still more definite our idea of what the promoter is, to notice also what he is not.

Promoters often join together in firms, as lawyers and engineers do. The benefits arising from such union are in many cases great and patent. But, however influential and advantageous the firm may in any case be, the promoter is seldom lost in his firm.



Again, as already remarked, the promoter may or may not be an inventor, and, if he is an inventor, it is not in his character as an inventor that he acts as a promoter. Most commonly the man who markets an invention is not the inventor himself but a professional promoter, who may know only the general principles which the invention involves.

In like manner the promoter may or may not be an expert at the business he is seeking to launch. If he happens to be, all the better, probably; yet many of the most successful promoters have become such without expert knowledge of their own, depending for this upon engineers and other trained agents, whose skill and services they could command for money.

The promoter as such is not and cannot be any one's agent. He acts on his own hook. Himself is the interested party to all he does and promotes. Till launched his scheme is his and his alone. Agents and employes, armies of them, may work for the promoter, many of them knowing details and depths of his undertaking better than he does, making him, it may be, very dependent upon them. None the less, both in law and in customary speech, the party fundamentally interested is the promoter, not any one or ones among his working staff or all of them combined. The law is very insistent on this point, always singling out some one man or firm as the responsible promoter of any novel enterprise, to reap the profit of it if such emerges, or to bear the blame if it fails. *Alger. The Law of Promoters, etc.*

The underwriter or group of underwriters advancing cash for the proposed undertaking and expecting recoupment by selling the new corporations' securities, is another entity never to be confused with the promoter. Underwriting is usually indispensable to a conversion of any magnitude. In many a deal the underwriters are far the most prominent factors, their profits fabulous and their names heard and published though the promoter's remains unknown. Still, their office and even their service is wholly secondary, and they would never have been called in or thought of had not the promoter pioneered the way and made the dry bones live.

The view is nearly as common as it is erroneous, that promoting is inseparably connected with the trusts, as if promoters had never existed before trusts came to be. This is an entire mistake, as pointed out in great detail by Mr. W. G. Langworthy Taylor in the Journal of Political Economy for June, 1904.

Oakes Ames was a promoter, if ever there was one. Commodore Vanderbilt was a promoter. Our earlier railways and railway combinations, no less than our more recent colossal railway systems, were born of promoter's efforts. The years after 1870, before any trust had appeared, bristled with promoter's schemes—in Europe and in America, the storm being central in Austria and Germany, where a good part of the billion dollar French war indemnity fund sought investment. New railways were built, banks started, mines and furnaces opened, and factories erected; but, in each case, or at least as a rule, the project was wholly individual, involving new organization, large—often fraudulent capitalization, fake dividends, and the other features which American experience has since made so familiar, but not embracing any combination of plants or of corporations. It is safe to say that the proportion of promoting to total business was as great in Germany and Austria 1870-75, no trust yet existing, as in the United States 1899-1903, the golden age of trusts; and that it was far more reckless and disastrous in those countries then than it has been in our country during the trust years just past.

It is now in order to raise the inquiry which my address was, I presume, expected to answer; whether the promoter, whose portrait we have tried to outline, is a producer or a parasite, a boon or a burden. Does he contribute to the social pile or simply help pull it down after we of the sweaty brows and horny hands have heaped it up? Are not dead promoters the only good kind, as General Sherman said of Indians? Is the promoter a worthy member of the body politic or a grafter? Would his annihilation be a benediction, to be hailed with hallelujahs as making the majority of us better off, or a calamity, tending to impoverishment?

In the answer to this question will lie that to the kindred one, whether the promoter-function is destined to be permanent in industry; for, if it is a healthy force it will continue, while, if its net tendency is disadvantageous, we shall probably find some means of getting rid of it and of administering industry on some other plan.

I am going to face those questions and answer them the best I can. Meantime a few remarks may serve to pave the way.

Current rage against promoters is in great measure simply part and parcel of the popular hostility felt against all the wealthy. This hatred, so deep, so widespread, so intense even to savagery, so unreasoning and so relentless, I deem the most dangerous sign of our time. If the mob alone felt it, this brutish antipathy would be less appalling; but it has sympathy and support in all classes, even among the rich themselves. Hardly a newspaper in the land but frequently gives it voice. Pulpits are equally intemperate.

The pity is that this gnashing of teeth goes on against the rich as such, without the least discrimination between good and good-for-nothing. When distinction is made, it nearly always favors the idle rich, especially if they are generous, against the energetic and creative rich, e. g., Carnegie was thought little of till he retired and began founding libraries. This zeal of his I commend, but the man's main benefaction to the public lay in the business he built up. Wealth must be created before it is given away.

We howl down alike the helpful rich and the harmful, the industrious and the lazy, the thrifty and the spend-thrifty, those making life easier for all and those making it harder. If you are well-to-do you are lashed and pilloried and your name cast out as evil, though no breath of fraud attaches to your doings and your whole life is one of ardent philanthropy. I have heard it said soberly, by educated people not given to folly in most things, that an honest millionaire never existed and never can exist, on the alleged ground that honesty and great wealth were contradictory opposites. What wonder that less well-informed men believe this insanity and preach it like crusaders?



The promoter is supposed to get rich; he is therefore accursed like others classed as rich. He is in with Wall street. He has helped launch trusts! Away with such a fellow from the earth; it is not fit that he should live!

Promoters' unpopularity at the present time is largely due to the fact that promoting is identified in the public mind with the operation of mammoth corporations and trusts, all whose uncanny doings are construed as so many reproaches to promoters. When corporate property is over-capitalized, when stocks are watered, when dividends are wrongfully paid or wrongfully passed, when small stockholders are frozen out by processes calculated to increase the plant's value, yet at the very same time cheapen it to nothing for the favored few; or when men suppose that any of these evils are proceeding, the promoter is every one's favorite rascal; people's speech being all to the effect that if he could be placed on the mortuary list all sorts of felicity would be assured the rest of us.

Enlarging capitalization, stock watering, and passing dividends to the discouragement of impecunious holders of stock, are all at times legitimate and necessary; but alike when they are right and when they are wrong they are the deeds of the corporation, not of any promoter.

No doubt a promoter may do much to shape the course of a corporation by him created. In "Frenzied Finance," Everybody's Magazine, August 1904, page 155, T. W. Lawson represents it as a crime that the Amalgamated dividend was cut (late in '91 or in '92), "without warning and in open defiance of the absolute pledges of its creators." Unless the money saved was stolen, or the stock "beared" for speculative purposes, it does not appear that this cut was, at worst, more than an indiscretion, as the saving could not but make the concern the stronger. So of the first passing of dividend in United States Steel common. It created a great howl, but is now, I think, generally admitted to have been the only wise course.

Lawson deems it nefarious that H. H. Rogers, Wm. Rockefeller and Jas. Stillman let various parties who became interested in Amalgamated during the earlier stages

of the formation of the company suppose that they (these others) occupied the ground floor; "when in fact, there was a cellar underneath their floor, a vault beneath the cellar, a mine beneath the vault, and a secret chamber under the mine, the three parties named being all the while the sole occupants of this secret chamber."

Lawson's account does not, on its face, bear out his indictment, which may, for aught I know, be just after all. Did Rogers et. al. lie to the other parties? Did these parties pay for their interests more than said interests were worth? Did the promoters represent the property as more valuable than it bade fair to be? The fact that the public scrambled for the shares and paid three times too much for them, is not, by itself proof of anyone's fraud.

The promoter may even be a member of a corporation and, as such be still further instrumental. In such cases there may be ground for censuring him, with others, for the corporation's misdeeds. After all this is said, however, the evils complained of are in general not the promoter's work, and he should not be cursed on account of them.

Beyond all doubt, though, there are culpable and criminal promoters, who deserve all the maledictions they get. Only we ought not to reprobate the whole flock for the misdeeds of a few black sheep.

An unscrupulous promoter may proceed from the very first on a basis of lies, exploiting the gullibility of the ignorant public, with all the guilt of a bunco-steerer or any confidence man. His prospectus paints up Sahara to be a flower-garden. The mine to be opened is in the same county with a bonanza. Our well is within gunshot of a world-famous gusher. Some "professor" testifies to a belief that the same strata, only probably far richer, pass under our land. One man near our opening, who began last year as a grub-staker, is now a millionaire. Another has his cabin literally full of ore sacks awaiting transportation to the smelter; experts think his pile worth at least \$500,000. These and ever so many others have got rich quick; why should not you? Stock in the new company is selling fast, but as we wish to favor you, a block or two will be specially reserved for you

till early next week. If you cannot possibly raise the money meantime by mortgaging your home, pray let us know at once as so many are walking the floor to get your chance.

The ease with which money can be raised on such representations would be comical if it were not tragical and tragical if it were not comical. "A minister or a physician has a few thousands laid by, a woman has either saved or inherited a small amount, a workman or a farmer has managed to scrape together something for a rainy day. Such people are found by the thousands in every part of the country. From their accumulations they draw a small rate of return, often so small that they are constrained to add it to the principal, and do not venture to apply it to expenditure. Four or five per cent. clear gain is about all that can be expected. Their lives are hard, monotonous and barren. Before their eyes is constantly flaunted the luxurious extravagance of the wealthy leisure class. To such people the prospectus of a new enterprise is wonderfully attractive. In exchange for a few thousands it offers them a fortune. The offer dazzles them. Their desires benumb their judgment, The risk of the undertaking is forgotten. Few of those who put their money into a speculative scheme enter it with the thought of risk. The calm balancing of chances is the exercise of a superior order of mind. The speculator does not buy a chance, he buys what he thinks is a fortune. He has had a vision of a vein of ore or a great reservoir of oil. He has seen a populous town arise around the factory in which he has invested. He has forsaken the difficult paths of reason for the flowery fields of imagination and conjecture." E. S. Meade. "Trust Finance." 136. In this way many millions yearly pass from the pockets of the poor into the tills of unscrupulous promoters.

In another class of cases the fraud worked by promoters is less complete. The promoter knows that he is offering a valuable opportunity, and is justified in so representing; but he deliberately takes advantage of this fact to market a scandalous over-capitalization, in consequence of which, after running gaily a little while, the enterprise must fail entirely or be reorganized by bond-holders, stock-



holders losing all. Such disasters were common in Austria and Germany after 1870. A plant costing say, 100,000 marks would be got in hand for 500,000, and then capitalized by a stock company for two or three millions. For a time demand and prices were artificially boomed and high dividends paid. Then came depression, the passing of dividends after dividends, stock at zero, and crash. Glagau, *Borsen and Grundung-Schwindel in Deutschland*, 114.

"On May 8 and 9, 1873, the Vienna bourse witnessed a reign of terror. There were scenes as tumultuous as those of a revolution. The keynote of those days was the rapid, headlong depreciation of an overwhelming majority of the securities listed. Business on the exchange completely stopped. Chaos reigned. Despair took possession of the speculators. On the day of the great crash many of the curbstone brokers seized the highly respectable "closet" bankers by the throat and shrieked with dying despair for the return of their all, whereof the promoters had robbed them. Others, the sense of their horrible ruin bereft of reason and they sought in suicide an end of their misery." Wirth, *Handelskrisen* 520. The years following the Crisis of 1873 saw a perfect avalanche of suicides. Taylor, in the article named above, 395. He refers for the statement to Neumann-Spallart, *Uebersichten der Weltwirtschaft*. Vol. III., 56.

In a third class of cases promoters have made careful provision for the survival of the enterprise and for returns upon its preferred stock, but have been guilty of criminal or at least highly reprehensible negligence touching the fate of the common stock; subscriptions for which were nevertheless zealously solicited, in fact, had to be obtained in order to the success of the flotation. Some recent instances of trust financing in the United States seem to me to betray literal malice aforethought toward common stock purchasers—the deliberate, cold-blooded purpose to make them stand and deliver. Meade, 346.

It should be added forthwith that promoters hardly ever perpetrate these nefarious designs alone. They are aided by underwriters, equally guilty with themselves, in

cases, more guilty, occupying positions, as bankers, which enable them to beguile the unreflecting public as promoters could not. For those losses upon the stocks of promoted concerns of which the American public has heard so much during the last three years, promoters have been much less responsible than underwriters. No respectable banker has the right to enlist in the underwriting of a scheme, lending to it the sanction of his name, until he has caused the same to be thoroughly investigated, satisfying his honest judgment that it is at the very least no swindle.

Reckless, riotous overcapitalization by famous promoters and underwriters in a few notorious cases aired since 1900, has done more than all other causes in America to smirch the whole business of promoting, to make people feel that the only good promoter is the dead one. T. W. Lawson, in *Everybody's Magazine* for August, 1904, declares that the Amalgamated Copper Company has "been responsible for more hell than any other trust or financial thing since the world began." Its 1,550,000 shares, par \$100 averaged to sell, he says, at \$115, i. e., at \$15 apiece above par. In 1903 the price had declined to \$33. (p. 154.)

Mr. E. S. Meade (375) has shown that this frenzied finance of overcapitalization might have been prevented by proper national legislation, forbidding any interstate corporation to pay in dividends more than, say, a fourth or a third of its profits until a certain goodly reserve had been piled up; in other words, compelling more care for stability and less for immediate profits. Such a law would force promoters to act more soberly, discourage overcapitalization, keep rickety propositions off the market, and render new enterprises from the first investors' instead of speculators' affairs. It would make promoting less giddy, more safe and more popular, and it would deliver the promoter from a great part of the odium under which, now, he partly rests and partly squirms.

Besides reducing the frenzy of high finance, a United States law insisting that each new corporation doing business across state lines begin by accumulating a goodly reserve without regard to its early dividends, would produce

a number of other most benign results. It would: 1.—Drive speculating as contrasted with investing promoters and underwriters out of the business. 2.—Decrease mere gambling speculation and adventures on margins. 3.—Assuage the unfortunate public hostility toward large corporations and trusts. 4.—Multiply the number and lower the price of safe investments, bringing such within the reach of a greater number of citizens. 5.—Increase the rate of return on moneys safely invested, producing, among many other benign results, a lowering of insurance rates and a rise in those paid by institutions for savings. Meade 358.

Coming back at last to the question whether the promoter is a tare in the industrial field, to be rooted up and cast into the fire, or a useful plant, to be cherished and cultivated, we find the answer to a considerable extent anticipated by the discussion which has preceded.

There are corrupt promoters, who ought to be in prison, and there are valuable promoters some of whose doings will not stand scrutiny in detail. The essential function of promoting is, however, a valid, important, vital and indispensable one in modern industry, which the majority of promoters probably endeavor to exercise in good faith, with no greater selfishness or rapacity than characterizes business men generally. The criminal promoter ought to be imprisoned, and the purely speculative promoter ought to be either won or driven from speculative to sober methods; while the honest and sane promoter, being an invaluable agent of civilization, should be encouraged to proceed with his excellent work, lacking which the business world could make no progress even if it managed to keep going.

On every hand exist the most promising chances for the creation of new wealth. Waterfalls wait to be harnessed. The electric railway is as yet in the earliest infancy of its development. All over our country it will swell the size of cities and make passage between them a hundred-fold commoner. It will extend to suburbs and to far country parts the essential advantages of city life. Infinite new lines of standard railway will be required. Saving in all sorts of building enterprises will be effected. Shipbuilding



and ocean carrying will again be great American industries. Agriculture will be revolutionized and made to take on generally the scientific character it has here and there begun to assume. Innumerable new inventions and discoveries having industrial value may be confidently looked for.

The mining resources of the country are as naught to what they are destined speedily to become. Gentlemen, with all your grub-staking, prospecting and boring, you know almost nothing of the wealth the Rocky mountains conceal. No. "X" rays yet devised are able to telltale those measureless depths. I venture to believe that all the valuable metals exist there, within reachable distances, in amounts beyond our most liberal calculations or even our wildest dreams.

I used to be among those who thought that the earth's gold yield was approaching exhaustion. The Rand, Dawson, Nome, and the unexpected proficiency of Colorado and California mines have taught us the mistakenness of that view, which, it now seems to me, we were foolish ever to have entertained even without these revelations. No good reason has to my knowledge been advanced for doubting that the unexplored parts of Siberia, the Himalayas, Africa and South and Central America, will ultimately produce gold as copiously as Alaska is doing.

Criticise Leonard Courtney's recent article. His essential seems to lie in ignoring the fact that prices are steadier the greater the world's reservoir of fundamental money is, including, of course, both coin reserves and coinable bullion. Gold mining is not, therefore, for the world's wealth any more than for that of the thrifty miner, a losing business.

It is of consequence for all, and most vitally for the common man and the poor, that these chances for new wealth-making should be found out and developed. Our country is not too rich, but far too poor. All increase of wealth is a public and general blessing. It is this, into whosoever hands the new wealth falls, since those who get the title to new wealth and become its owners cannot

take a single step toward the utilization of it without sharing it with the rest of us.

I do not say that it makes no difference how the titles to the wealth of a community are distributed, that a country with innumerable millionaires will show as high a level of general welfare as one equally wealthy whose wealth is more widely scattered. Other things being equal, it is no doubt best that a nation's resources should be owned by very many and not by very few. But I do maintain and declare that, after all, the main thing is the piling up of wealth. If little wealth exists most of us must be wretched; whereas, if wealth is immense, however it is owned, all but the idle will be benefitted by it.

But the wealth-chances referred to will not be turned to realities unless by professional promoters. Others are too busy or too apathetic to attend to them. Usually it takes the keen, the trained, the practiced eye to ferret out the chance and even if the chance is patent to all, facilities for realizing upon it—reputation for honesty, energy, sagacity and attention to details, skill in using experts and in approaching and handling men, access to banking and railway authorities, and so on—belong only to such as have sedulously and laborously acquired them. It is not by mere hap that business pioneering has fallen into the promoter's hands. The craft is a necessary and benevolent product of business evolution.

Moreover, the good promoter is in it to stay. His function is not a temporary one, but permanent. The need of him will not diminish but grow ever greater as industry widens out its domain on the one hand and multiplies its details and its complexity on the other.

Well, then, granting that promoting is, on the whole, a public benefit, and that honest promoters will and ought to remain, fulfilling their wholesome and advantageous office, is there any hope that promoting of the vicious and criminal sort will, in the course of time diminish?

Approaching a reply to this question, I remark that no time is at present in sight when it will do to be off our guard. We, the dear people, must reform of our liking to be

humbugged. So long as the world is full of fools, cheating of all sorts will abound and the conscienceless promoter will have his loot. Meade 373, 363.

While we cannot too vehemently reprehend all dishonest promoting and underwriting, and while laws and public opinion should be used to the utmost toward suppressing those dark practices, people must, after all, in the last analysis depend on themselves, their own insight, common sense and sagacity, to prevent being plucked by cormorants of these classes. After the lessons of past years, adults who lose by being drawn into unseaworthy schemes, should be ashamed to plead the baby act.

Besides judicious legislation, besides the needful education of the investing public, teaching us to be more wary in the face of hoaxes, less gullible, less anxious to get something for nothing—I expect much from that slow but sure moral amelioration of men which I believe to be going on, assuaging not the quest of wealth, which, if the motive is good, is entirely consonant with the highest virtue; but lessening the desire of wealth as an end and rendering the cunning and crafty less ready to take advantage. I do not speak of the millennium. In a day much nearer than that, it shall, to all but the very basest, seem better that a man act in all things with scrupulous justice, dealing to each his due, and helping to build high the pile of social and general wealth, than that he scheme to best his fellows at any cost, in order to live in a great house, ride in a private car, sail a yacht, and rot when dead under an immense pile of marble.



## The Investor in Mines.

BY F. WALLACE WHITE, CLEVELAND, OHIO.

The daring spirit of the investor in mining has enabled America to lead all other countries in its material progress, and it is further a well-known fact that a large share of this progress has been brought about by the efforts of that class known as promoters.

What then of the promoter and his relation to the investor in mines as well as to the mining industry? Is there a single person within the hearing of my voice who will not agree with me that to the daring of some promoter belongs the creation of nearly all the great progress of the western half of America? Who, but a daring promoter was it that conceived the plan of building the Central Pacific and Union Pacific railroads across the continent? Who, but promoters have brought the capitalists and mines together in a bond of profitable undertaking?

The increase in production of our mineral wealth has been something enormous, as is best evidenced when we compare the production of 1898, which was \$370,000,000 with the production of 1903, which was over a billion of dollars.

The immense influence wielded by the mining industry is recognized by but few. That the rise and fall of nations and empires ever depended upon the output of mines may seem, to many, at first thought, untrue but investigation into the past history of man himself and his civic governments will substantiate this statement.

One of the reasons why civilization flourished so early in Egypt was because the Egyptians early learned the art of metallurgy. They worked copper prior to the building of the great pyramids, some 6,000 years ago. According to Diodorus, who lived 1,400 years before the birth of Christ, the great mines of Nubia annually yielded bullion to the value of \$650,000,000, and Egypt was for many years the

mecca for innumerable caravans that converged thither from all Asia.

The gold of Lydia, the silver mines of Greece, the gold mines of Macedonia, the sulphur and quicksilver mines of Spain, and the silver mines of the Hartz mountains, Germany, have exerted an irresistible influence on the history of Europe and Asia, affecting commerce and politics.

The discovery of gold in California, in 1848, is within the memory of the present generation. The tremendous influence that discovery has exerted upon the political and economic development of the United States, is plainly manifest on every hand. Up to that time the United States had been poor, its credit weak, and its resources undeveloped. It is true, previous to that time there had been some mining in the United States, probably a total of half a million dollars a year would have covered the entire output, but with the discovery of gold in California an impetus was given, not only to mining, but to all other branches of industry.

From a nation of borrowers we have become a nation of investors.

The combinations of the investments of the many have rendered possible greater mining enterprises, adding to the truth of the old saying: "There is that which scattereth, yet increaseth." Mining along legitimate lines has become the great modern missionary, the bulwark of national progress and commercial supremacy; has opened the wilderness and the desert plains, built great cities and added refinement and civilization to places where there was savagery and desolation. It has contributed more than any other industry to make the United States the wealthiest government in the world, and this has been brought about to a large extent by many small investments of the masses in legitimate mining propositions.

In the words of Mr. Mahon, the worthy secretary of this congress:

"The mining industry of America needs no apology from those seeking recognition for it at the hands of the Government. To this, more than to any other cause, this

country can attribute its wonderful strides and its prestige among the nations of the earth."

The production of more than a billion dollars of mineral wealth in a single year means much to the business of this country, especially when all this wealth is entirely new with absolutely nothing of a fictitious character about it.

I believe in the recent expression of Mr. John Hayes Hammond, that:

"There is a tendency to carry on mining operations on a larger scale than ever before. Syndicates and companies with larger capital at their disposal are entering the field. Capital is beginning to recognize the fact that the mining industry is now being prosecuted on a more scientific basis than at any time in the history of its development. Its attractiveness as an investment is more seriously considered and is not regarded as a gamble. Mining engineers and mining investors have more regard for the commercial aspect of mining as conducted to-day than formerly."

Conditions warrant the assertion that the mining industry has an outlook for greater prosperity this year than ever before. Interest in mining has had a healthy, steady growth during 1904 and the industry is growing in popularity and is more and more receiving recognition as a most profitable and ideal field for investment. Many repentant speculators have learned wisdom after repeated experiences and with what has been saved from the wreck of the speculative bubble, are turning to mining where there is no longer any question as to the earning power of capital.

The great financial rulers of the country during the past year have, many of them, turned to mining and their money has been invested in many mining sections. The names of conservative bankers, well-known throughout the country, who in past years perhaps have used their influence against investments in mining, have during the past year been equally as earnest in the organization of mining companies. Investors of all classes with money have eagerly sought mining investment, deserting the shrine of speculation to purchase with their money the favor of and swear allegiance to the king of all industries,—mining. The



hand-writing on the wall has appeared and proclaims that the most profitable field for capital is mining. The intelligent investors will follow the example of the bankers, railroad magnates and oil kings, and invest in good propositions that have evidence of good management and are being developed by skillful experts.

There's going to be a mighty rising of the tide, during the closing portion of 1904. Capital is going into mining and greater output will result, development will be hastened and the mining industry will be more prosperous than ever. This is the sign of the times, the outlook for 1905.

The influx of capital is, to a very large extent, brought about through three avenues:

First: The Mining Engineer.

Second: The Mining Promoter.

Third: The Mining Company.

All have their uses, all have their abuses in the mining industry.

On the personnel of the mining engineer I shall touch only lightly, for with so many eminent and world-renowned men before me I believe that it would be safer for me to reserve my heavy ammunition for the promoter, especially as the kind of promoter to whom I shall refer, is absent from this Congress. I really feel that I will be entirely safe, by not saying very much about those who are present, but give it good and hard to those who are absent. Do you not agree with me, gentlemen, that I would be safer in so doing?

The reason why I do not have much to say about the part of the mining engineer is this:

From the standpoint of the "Investor in Mines," and especially the public at large—the damage has generally been done before the help of the mining engineer is called into service by the investor in mines.

The largest amount of money lost in so-called mining ventures is lost by the public buying stock in so-called mines, which are only prospects, and, in most cases the money paid by the buyers of millions of shares of mining stock is never expended or used in any development of such

prospective ground, but finds a lodging place in the wild-cat promoter's pocket, or perhaps is spent in sky-rocket advertising. The large volume of money thus abstracted from the public pocket, is primarily done under false representations, which entitle the offenders to punishment.

Is there not then a most serious aspect of affairs confronting this Congress, assuming as I do that one of its declared principles is to create interest by means of our national government in the mining industry, and to bring into closer relation the thousands of men engaged in the development of mines?

I should like to see a special effort made to interest the Legislatures of every state in the United States in the mining industry from the standpoint that the citizens of each commonwealth are being swindled and robbed of millions of dollars every year by unscrupulous sharks who are a leach upon one of the grandest industries of this country. I take the stand that the Legislatures of the several states owe it as a duty to their respective constituents, to place upon the statute books of each state such laws as will have a tendency to eliminate and eradicate this evil.

I would like to see this Congress adopt resolutions before its adjournment that would place it on record as pledged to doing all within its power to have passed such laws as are urgently needed, feeling sure that the mining industry could not but be benefited by wholesome laws giving protection to the "Investor in Mines."

Some care and discretion should, of course, be used in the framing of such laws. They should not be made to work an injury to the prospecting for mineral, but should especially be made to prevent and punish misrepresentations.

The investing public of America has a great inclination to invest in mining. To illustrate this point, I recently visited a prominent banker in Michigan who is interested in several mining properties, and during our conversation, this banker said to me:

"There are \$50,000,000 of cash lying idle in the savings banks of the state of Michigan, every dollar of which is available for investment in good mines to further their de-

velopment and equipment, if the owners of this money could be convinced that they would not be swindled out of it, but, on the other hand, that they would get returns on their investments."

And my experience is no doubt the experience of many others who have endeavored to interest capital in the mining industry.

The immense wealth taken from American mines is a great inducement to investors. But it cannot be said that there is a lack of confidence in American mines, for such is not the case. It is the fear of being swindled, the lack of knowledge, the lack of thorough and reliable information which create a suspicion in the mind of the investor in mines.

Sharks enter the mining business as they do into other industries, but the losses which are entailed by their thieving propensities or by the silly indiscretions of investors, who invest first, and investigate afterwards, should not be criterions of the industry. These failures, though, are used to the detriment of mining.

It occurs to me that as a help toward eliminating this evil, we might turn to the mining engineer.

Would it not be possible to secure entire, open-hearted, and absolute assistance and support for the mining industry from our mining engineers?

I am aware that some mining engineers consider it unprofessional to take the public into their confidence, and I am free to state that this, to me untenable position of the mining engineers, has raised up a barrier between the investor in mines and the very men who should be the investor's first and truest friend and supporter.

The tendency of the mining engineer to hold himself aloof from the investor has resulted in the condition now existing; namely, that the average person who, in considering an investment in a mining property, when he comes to a mining engineer's report, generally skips it, first because he does not understand its terms, its technicalities, or its phraseology; second because he imagines it simply a paid-



for statement of some "expert" and does not, in his opinion, amount to anything.

With the larger capitalist, of course, it is different, but I am not dealing to-day with that particular class, principally because I do not think he is in need of any special consideration at the hands of this Congress, believing as I do that he is abundantly able to take care of himself and his capital.

It is the unsophisticated investor that I have in mind—the one to whom mining is as a sealed book—the average investor in mines, who I believe stands in need of a better acquaintanceship and closer relation with the mining engineer.

In my experience in financing mining enterprises, I have often advised prospective investors to get together, and before investing their money in any mining enterprise, to employ a competent, practical mining engineer to examine for them at their expense the property in which they were asked to invest.

It has occurred to me that the fraternity might find a wide field of usefulness in making such examinations, as well as profitable and continuous employment.

It occurs to me that here is a great field for the mining engineer, for the purpose of his examination should be the double one of rendering judgment upon the mining property both as to its present and prospective value. This judgment should be couched in plain language, free from technicalities, so that the average unlearned man may readily understand it. No set laws or rules can possibly guide the mining engineer in his investigation of a report upon mining properties. His practical experience should alone guide him in formulating his final report, ever bearing in mind that each individual property must be considered and passed upon, on its own merits without any reference to any other property.

Herein, then, in my opinion, is a very large field for the mining engineer: a field that would prove a very profitable one to the "Investor in Mines" and a field that to the mining engineer should be made remunerative.

Now as to the promoter.

In the present methods of promoting and financing mining enterprises, through the co-operation of a large aggregate of small investors, these investors being generally widely separated and as a general thing to a very large extent unknown to each other, the promoter has come to be a necessary adjunct to the mining industry; the promoter is the agency which brings the capitalist, be he little or large, and the mining property into closer relationship.

I make the claim that the honest promoter of a legitimate mining enterprise renders as great a service to the mining industry as does the most brilliant mining engineer.

I will add to this, that the mining industry needs the honest promoter as much as it does the mining engineer and that in fact the two should work hand in hand for the uplifting of the grandest industry of our country.

The promoter's services are required to bring the attention of capital to the possibilities of the mining industry, to secure capital for the development of prospective mineral ground into a mine, or the equipment of a developed mine into a producer.

If this be true, possibly it is to a large extent, I would say that an opportunity presents itself to the Mining Congress to assist in the education of the public to a realization of the facts of mining as an industry.

And yet, when the promoter approaches a man and tells him he wants to present a mining proposition for his consideration, the prospective investor is skeptical. What is it that has created this doubt in the average man's mind that there is no money for him to be made in mining for precious metals?

I think that we can look for the answer to organizers of mining companies who bid for public support through promises of returns larger than even the great industry of mining can fulfill. I refer to what I shall term the mining shark who, in his attempt to make money not out of mining, but out of the mining business, misrepresents to the investor. This class of wild-cat promoters fail to realize that mining as a business can be carried on with the same

degree of certainty as our mercantile institutions. Then there is the "well-intentioned promoter" who has drifted into the financing of mines generally from the lack of something better to do, but who, at the same time, may be honest and well-meaning, but in his ignorance of the necessities of mining, makes the mistake of promising dividends before the ore reserves are established with the result that while dividends may be legitimately declared from surface workings it is only a matter of time before the operator finds his property in a position where dead development is imperative, thus necessitating the cessation of dividends. Men and women who have bought stock under the promise that dividends would be continuous, not understanding mining, attribute the cessation of dividends to the failure of ore, and general dissatisfaction results, thus all parties interested suffer. Whereas had the mine been properly developed before dividends were declared there would possibly have been a long and prosperous career for those identified with its securities. This class of promoters allow the investor to believe that a few dollars is all that are necessary to make a prospect hole into a producing mine.

He fails to realize that before dividends can be paid they must be earned from mining and selling the product of the mine. He fails to realize that in either case the ore must exist. It has occurred to me as I look out over this great body of men from all parts of the country that this Congress could do something to eliminate the mining shark from the mining industry. It seems to me that this industry of ours is too good, too grand, to have foisted upon it these leeches; it seems to me, that there are two ways to go about a reform which is greatly needed in this country.

One way would be for this Congress to adopt measures and if necessary appoint committees for each and every state in the Union to work with the object and purpose of placing upon the statute books of each and every state a law similar to the one that Washington has placed upon its statute books. It seems to me that a law should be so made that it would punish the promoter who misrepresents.



any property to the "Investor of Mines." It appears that the Legislatures of the different states should protect the citizens who are being swindled by these wild-cat promoters out of money that does the mining industry no good, but a great deal of harm. It seems to me that a determined campaign should be entered upon to acquaint the State Legislatures with these facts and to have them pass laws to protect their respective citizens.

The other plan I have in mind is to educate the layman and average investor in the actual facts concerning the mining industry. I do not wish it to be understood that I would have laws passed that would hamper the development of deserving prospects or the equipment of producing mines, but these laws should act against the wild-cat, thieving, mining shark.

Then, gentlemen, I come to the third factor that I had in mind; the company. If I were asked by an investor relative to what kind of a company he should go into, I would say: "You should associate yourself with conservative business men who have a desire to make money out of the mines by honest endeavor to open up the properties; men who have shown their faith by the use of their own money and time. Join a company which has in its personnel men who have demonstrated their ability as miners."

If I were asked how to guard a mine investment I should say by keeping track of what is done at the mine, as the mine and it only can make money for you. Investigate the company yourself if you can, and if you cannot put your faith in men whom you have reason to believe are honest and capable and follow their advice. Invest when you have facts before you but do not wait until everybody knows that the investment is a safe one. If conditions should become unfavorable, do not worry; if conditions should become very favorable do not get the big head. Hold on to your investment; for in the realization from the dividends of a good mining stock you will derive more profit than you could get for your cash—a good mining stock is one of the best assets in the world.

Now gentlemen, one word with reference to the future of the American Mining Congress. I feel a natural pride in the development of the Congress, a pride that has grown upon me as I have seen its usefulness.

It is only a wish of mine that the good work should continue in the same spirit as in the past.

It is my earnest wish that the different factors in the mining industry should come in closer touch with each other. To accomplish this I have but one suggestion to make, namely:

That you organize—For there is nothing like thorough organization to produce results.

I am sure in the delegates to this convention can be found men who will carry out the aims and purposes which I would have this Congress adopt. I am sure that among the delegates to this convention there will be found men who have the character to make this Congress a great factor as a beacon to light the way for the "Investor in Mines."

## Concentration of Copper Ores in the Southwest.

BY FRANK H. PROBERT, A.R.S.M., CONSULTING MINING ENGINEER,  
LOS ANGELES, CALIFORNIA.

At the suggestion of Colonel Thomas Ewing, your vice president, and on direct invitation from the Council of the American Mining Congress, I have endeavored, in the following pages, to put on record the results of an elaborate series of experiments carried on mostly under my personal supervision, at the instigation of the Detroit Copper Mining Company, the Arizona Copper Company and the Shannon Copper Company of Morenci and Clifton, Graham county, Arizona, during the last few years, on the economical concentration of the copper ores of that field. I regret that with the limited time at my disposal, I have not been able to treat the subject as comprehensively as it deserves. Such a subject offers practically an unlimited field for research; careful investigation and constant experimenting will alone solve the intricate problems connected with the concentration of low-grade ores; to attain the highest extraction, closest attention to detail must be given; the saving of an extra one-tenth of one per cent. from tailings may add thousands of dollars to the profits of the company in the course of a year; the conservation of water in these arid regions is imperative; the disposal of the tailings from these large mills must be considered; high efficiency and low cost are factors of the utmost importance. Technical literature of to-day, while giving the fundamental principles of the concentration of ores, mill designs and a general review of milling practice, cannot possibly contain the actual results of experimental work conducted on a large scale. It would be too voluminous, but these are points which are of vital importance to the engineers responsible to their employers for results. The saving of the dollars and cents is paramount to everything else in mining work, and anything that tends towards this end should be of benefit to the community. The data in the body of this paper is the result of



very careful, tedious experimenting, oft-times repeated, and while it is not as complete as I could wish, my mission will have been filled if it calls forth a liberal discussion either in the meeting assembled or in the technical press. Exchange of opinion, free and liberal distribution of data obtained, and friendly discussion can alone forward the mining industry, and anything that benefits a community is a benefit to the world at large. As I have said, pressure of business has prevented me from treating the subject exhaustively, but I earnestly hope that brother engineers will come forward with their experiences, and swell the fund of information for the advancement of the great industry in which we, as the American Mining Congress, are so deeply interested.

The "open door" policy is as essential in the scientific as it is in the commercial world, if progress is to be made. The absurdity of secrecy in matters which would be of inestimable benefit to others, while not detracting in any way from its value to the fortunate possessor, must not be tolerated. A suggestion is often productive of far-reaching and important developments. Much has been done to tear down the barrier, much more remains to be done, and I voice the sentiments of the mining engineers as a class, and particularly of those present at this meeting, in asking that the directorate of our big companies be more liberal in allowing their engineers to publish the results of their labors.

The Morenci-Clifton district is situated in Graham county, Arizona territory, about eighty miles north of Lordsburg, a station on the Southern Pacific railroad. The Arizona and New Mexico railroad connects the mines with the main trans-continental trunk system. The mines have been steadily producing for over twenty years, and while the richer ore bodies have been practically worked out, with improved methods of treatment both in concentration and smelting, the output has, if anything, increased, and to-day the district ranks among the foremost of the world's copper producers. Necessity is the mother of invention, and with the impoverishment of the ores, advanced methods have made it possible to maintain a steady production. Three

and one-half per cent. ores are now being treated at a profit, and it is only a question of time when even leaner ores will be the main source of supply. The production of copper by the Clifton-Morenci district for the last four years is given below:

For six months ending March 31, 1904, the Arizona Copper Company alone smelted approximately 50,000 tons of ore and concentrates, together with 750 tons of copper derived from the leacher, resulting in a gross yield of 14,756,742 pounds, which was equal to a monthly average of 1,229.7285 tons. The smelting ores and concentrates gave an average yield of 13.35 per cent.

The concentrators treated 231,552 tons of low grade ore, yielding 35,093 tons of concentrates or a concentration of 6.6 tons of raw ore into one ton of concentrates. Statistics from the Detroit Copper Mining Company and the Shannon Copper Company are not available, but in round figures the total production of pig copper from the district is ninety tons per day.

With the falling off of the average copper contents of the ore, more attention will be given to increased efficiency in operation and lower cost of production than to the making of more copper. The enormous reserves of low grade ore assures a long life to the mining industry in this section.

The topography of the country affords excellent mill sites, and in the West Yankee and Longfellow concentrators, very little material has to be raised by elevators to the several machines. The sharply incised canons draining into Chase creek and the San Francisco river have served as dumping areas for the tailings, but owing to the accumulation of silt in the lower portion of the Gila river along the Gila valley, the farmers of the valley have raised an outcry, and the mining companies are obliged to devise some scheme whereby this menace to agricultural interests shall be removed. During the rainy season, the bed of the rivers is washed out, and millions of tons of tailings are carried down to the valley below. Of the proposed methods for disposing of the tailings, I will speak later.

Elsewhere\*, I have given an outline of the general geological features of this interesting field, but as, for the subject under discussion, a knowledge of the ores treated is necessary, I will briefly describe them. The concentrating ores consist of a highly altered porphyry containing particles of chalcocite—secondarily enriched pyrites—disseminated through the mass. The character of the ore varies considerably and all phases of decomposition and alteration of the porphyries are to be seen in the bins. Sometimes the superabundance of feldspar, and its extreme kaolinization makes the ore almost a talc, and then one may find an excessive amount of quartz, so that the hardness of the ore and its tendency to slime is very variable. Undoubtedly the primary form in which the copper occurred was as chalcopyrite but oxidation of the surface ores and the percolation of the resulting cupriferous ground water has produced the chalcocite ore of to-day. Microscopic examinations will show partial or complete replacement of the pyrite, and nearly all the sulphide ores mined to-day contain the copper in this form. Oxides and silicates as well as sulphides are present, so that the ores sent to the concentrator are complex both as regards the gangue and the contained mineral. Such complex ores call for a perfect adjustment of the machines if a clean product is desired. The ores going to the West-Yankee concentrator—Detroit Copper Mining Company—are, comparatively speaking, free from oxides and silicates; the Arizona Copper Company treat their oxide ores in a separate mill, but the Shannon mill is handicapped in-as-much as it receives a very mixed feed, and it is surprising that such clean concentrates are obtained.

A table of specific gravity of the several copper minerals found in the Clifton-Morenci copper belt follows:

Specific gravity of chalcopyrite varies between 4.1-4.3

Specific gravity of chalcocite 5.33.

Specific gravity of chrysocolla varies between 2.0-2.03.

Specific gravity of malachite varies between 3.7-4.0.

Specific gravity of azurite varies between 3.5-3.8.

Specific gravity of red oxide varies between 5.8-6.1.

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\*Eng. and Min. Journal, December 24, 1900.



Specific gravity of quartz 2.64.

Every effort is made to grade the ores as evenly as possible, and every care is exercised at the mines to keep the several classes distinct.

*Fundamental Principles.*

Of the several laws which govern the wet concentration of ores, that of equally falling bodies is probably the most important. Bodies falling free in a fluid fall at a speed proportional to their weight divided by the resistance. From this it will be seen that small masses of a heavy mineral will fall as rapidly as large masses of a light material, owing to the fact that the weight increases as the volume, and the resistance only as the area. The fundamental principle underlying all hydraulic concentration depends on the difference of specific gravity between the gangue matter and the contained mineral. Given two particles of equal size falling through a column of water, the one chalcocite having a specific gravity of 5.334, and the other quartz-specific gravity 2.64, the chalcocite would have a much greater velocity than the quartz, and according to the law quoted above, if the grain of chalcocite falls with a velocity of five inches per second, a particle of quartz, to fall with the same velocity, must be 2.07 times as large. Hence it follows that to obtain the best results, close classification of the several sizes of the particles must be effected. A machine cannot produce clean concentrates if the feed contains particles varying from a 20 to a 200 mesh. Again, the relative amount of mineral to gangue matter in the feed of any given machine requires careful watching and adjustment. The best results are obtained when the tenor of the feed remains approximately the same.

In nearly all the mechanical contrivances for the treatment of fine particles, the principle is the same. If a watery pulp containing grains of varying specific gravity be fed onto a flat surface, such as that of a vanner or table, which has a pulsating movement at right angles to the line of feed, the heavier particles, or those of higher specific gravity, by virtue of their weight, cling much more tenaciously

to the flat surfaces than the lighter, consequently, when conditions are favorable, the mineral stays on the table and travels forward as a clean concentrate, while the gangue matter which cannot resist the flow of water, is washed off as tailings. It may be that owing to coarse crushing there are particles of mineral intimately associated with some gangue matter; these will be intermediate in specific gravity between the concentrates and tailings, and constitute the middlings. It is a common practice to recrush these middlings and return them to the vanners or tables.

*The West Yankee Concentrator.*

This mill of the Detroit Copper Mining Company has a daily capacity of about 650 tons. It was designed some five years ago by Dr. L. D. Ricketts, consulting engineer for Phelps, Dodge & Co., and since its completion has been working steadily. Excavations are now being made for a new mill, and it is probable that in the course of another year 1,200 tons of ore per day will be required to keep the mills running. A study of the diagrammatic plan (Fig. 1) accompanying this paper will show the arrangement and disposition of the products, and will save a detailed description of the mill. Owing to the decomposed character of the ore, it has a marked tendency to slime, and as the finest slimes carry high copper values which are very difficult to save, great care has been taken to avoid undue crushing either in the breakers or rolls. The ore is sized as often as can be, and every effort is made to extract the values from the ore as soon as possible. Nearly sixty per cent. of the copper values are taken out before recrushing. The middlings and tailings from the several jigs are all sized in hydraulic classifiers before going to the Bryan mills, the finest products being taken directly to the vanners. The mill is divided into two sections, east and west, and until quite recently, Bryan mills were used for recrushing on the one side, high speed rolls on the other. The relative efficiency of these two types of machines was thoroughly tested; the quantity of slime produced and the length of time they were stopped for repair were the crucial points,

and finally it was decided to substitute Bryan mills for the rolls. The products of the Bryan mills are sized, the coarser material treated on fine jigs or Bartlett tables, the finer pulp taken to the Frue vanners. Tailings from the

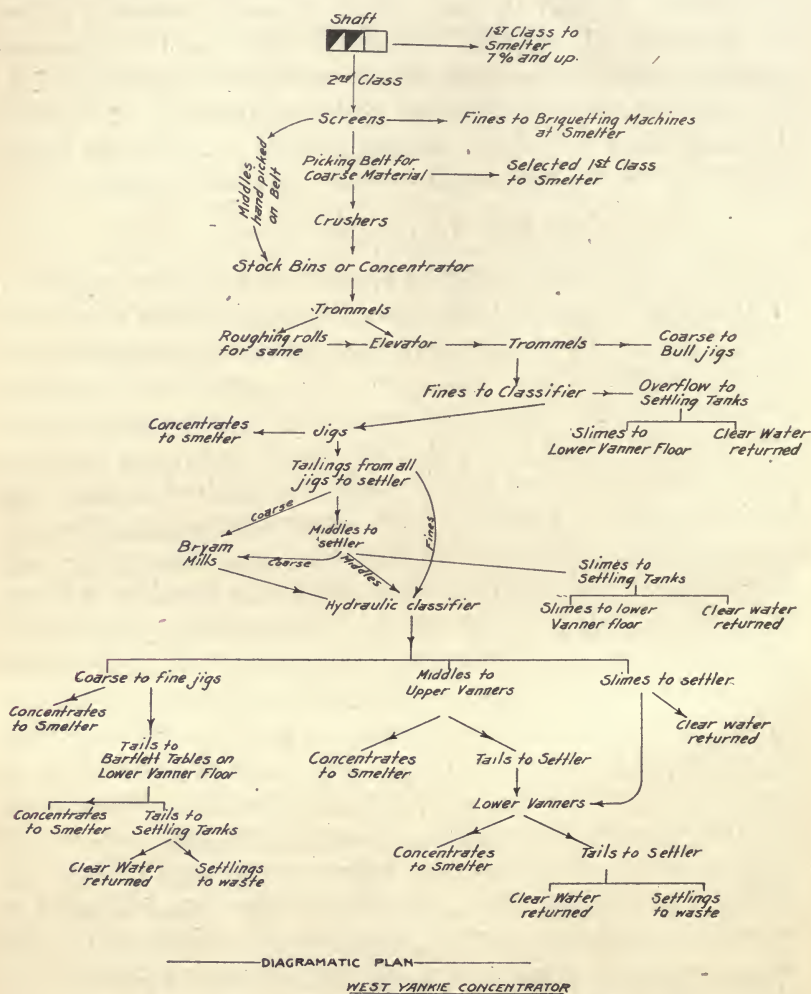


Fig. №1.

L.H. PROBERT

fine jigs, Bartlett tables and upper coarse vanners are re-treated on the lower vanner floor, the tailings from which are run to waste.

Power is supplied by three Crossley gas engines developing 280 horse-power. The gas for fuel is manufactured



at the company's gas plant, using the Loomis Pettibone system.

*The Shannon Concentrator.*

This mill, erected on the Shannon hill above the smelter has a daily total capacity of 500 tons. The system adopted is similar to that of the other companies operating in the district. Huntington mills are used for recrushing; the upper vanners are fitted with corrugated belts, the lower with plain belts. Power is taken from a Nordburg steam engine. Owing to the fact that the mill is built above the smelter, with the ore bins between, all the ore has to be elevated to the trommels at the top of the mill on an endless belt, after being crushed in the breaker.

*The Longfellow Concentrator.*

Of the five concentrators of the Arizona Copper Company I have selected this one as being the most up to date. It has a daily capacity of 350 tons. It is built on the slope of the spur of Chase Creek Canyon, everything is worked by gravity, and the tailings are dumped into the canyon below, draining into the San Francisco River. The trial run of the mill was made on August 1, 1901, with very satisfactory results, and it has been in commission ever since. Power is derived from three Crossley gas engines, taking gas from the company's gas plant. As an auxilliary and "stand by," there is a single direct acting Corliss steam engine.

The ore bins are on a level with the railroad track. They have a capacity of 450 tons and are lined with one-half inch sheet iron. From the bins the ore passes to a Blake crusher, set to crush to one and one-half inch ring, then to roughing rolls and so to the mill stock bin. Elevated by a bucket elevator, it is fed into one of two trommels and graded into 1-4, 3-8, 1-2 and 3-4 inch sizes, each product going to special jigs. The jig tailings are reground in five-foot Huntington mills using two, and two and one-half millimetre mesh screens, and so to the classifier, from the several compartments of which the pulp is distributed to Frue vanners fitted with corrugated belts. There are eighteen of these machines arranged in three series of six.

The vanner tailings are elevated to the Huntington mill floor and again crushed in two Huntington mills of one, and one and one-half millimetre mesh screens, and the pulp, together with the slimes from the classifier below the jigs, is treated on another set of vanners, using plain rubber belts, arranged in another three series of six. The tailings from these machines run to waste, after passing through a series of settling tanks. The clear water is returned to the mill.

#### *Water.*

In the arid regions of Arizona, where water is so scarce, every precaution has to be taken to prevent waste. The tailings from the mills are allowed to settle in an elaborate system of tanks, and the clarified water is pumped back again into the mill. The water for the Morenci concentrators is pumped from the 'Frisco River, seven miles away, against a head of 1,500 feet and stored above the concentrator in tanks of 500,000 gallons' capacity. It used to cost the company twenty cents per 1,000 gallons, but since the new pumping plant has been completed, this figure has been shaded somewhat.

By settling the tailings and repumping the water, the Detroit Copper Mining Company is concentrating one ton of ore with 300 gallons of water added to the mill circulation.

At Butte, Montana, they generally figure on three gallons per ton per minute.

At the Longfellow concentrator, about 150 gallons of water are used per minute, which is, roughly speaking, 600 gallons per ton of ore crushed.

I regret that I have not the figures from the Shannon concentrator, but it approximates to 550 gallons per ton of ore milled.

The following extracts from the monthly reports of the Detroit Copper Mining Company are interesting.

JULY, 1901.

Water used, 4,672,500 gallons.

Running time, 566.5 hours.

154.9 gallons water per minute.

440.6 gallons of water per ton of ore milled.

449.09 tons ore per day.

6.65 tons ore equal 1 ton concentrates.

Saving effected, 84.05 per cent.

DIAGRAMATIC PLAN

LONGFELLOW CONCENTRATOR

L.H. PROBERT.

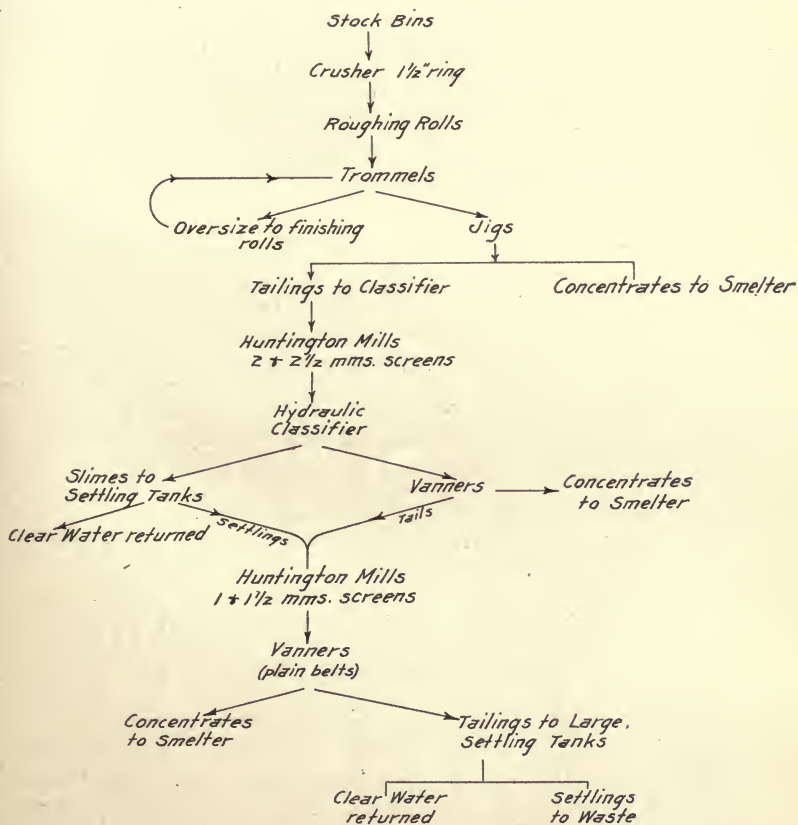


Fig. No 2.



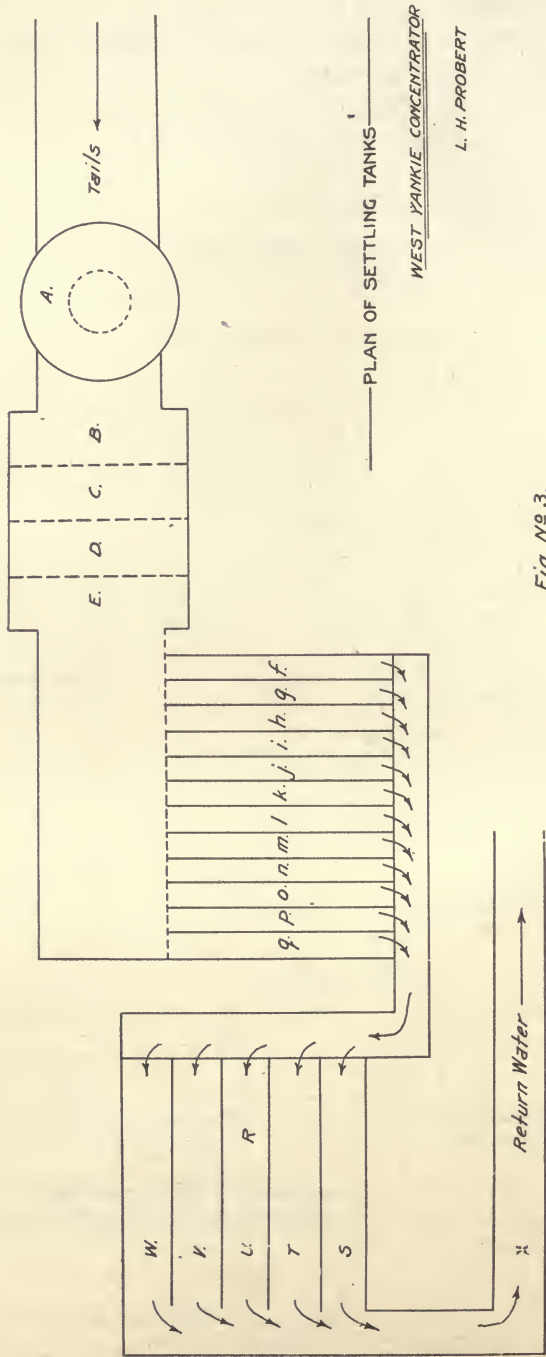


Fig No 3.

## AUGUST, 1901.

Water used, 4,424,000 gallons.  
 121.2 gallons water per minute.  
 426.2 gallons water per ton of ore milled.  
 409.45 tons ore per day.  
 6.608 tons ore equal 1 ton concentrates.  
 Saving effected, 83.48 per cent.

## SEPTEMBER, 1901.

Water used, 5,059,400 gallons.  
 Running time, 632.25 hours.  
 133.4 gallons water per minute.  
 398.6 gallons water per ton of ore milled.  
 481.875 tons ore per day.  
 6.961 tons ore equal 1 ton concentrates.  
 Saving effected, 82.72 per cent.  
 10,870.715 tons tailings produced, assaying 0.765 per cent. Cu.  
 Loss of copper in tailings, 83.61 tons.

## OCTOBER, 1901.

Water used, 5,583,066 gallons.  
 Running time, 660.5 hours.  
 140.9 gallons water per minute.  
 454.6 gallons water per ton of ore milled.  
 446.284 tons ore per day.  
 7.385 tons ore equal 1 ton concentrates.  
 Saving effected, 77.83 per cent.  
 Crude ore averaged, 3.64 per cent copper.  
 10,612 tons tailings produced, assaying 0.8 per cent Cu.  
 Loss of copper in tailings, 84.903 tons.

The tailings from the West Yankee concentrator are made to travel a long circuitous course (see Fig. 3) and every effort is made to clarify the water, but owing to the large amount of slime, most of which will pass through a 200 mesh sieve, it is next to impossible to return clear water. This question of the complete settlement of the slimes is a puzzling one, and one to which I have devoted a great deal of time and thought. A slow current assists the settling, but with such finely divided slime, no means as

yet tried have been entirely satisfactory. I find that if milk of lime be introduced into the tailings launder, it neutralises the free acid, oxidises the dissolved metallic salts, precipitating them as flocculent hydroxides. These flocculae catch up the small particles of alumina and silica which are in suspension, and carry them down with the precipitates, leaving the water, comparatively speaking, clear. I also find that a little soap solution added with the milk of lime accentuates precipitation by causing larger flocculae, owing to the formation of oleate of lime. At the borax works, Daggett, California, for the precipitation of the clayey matter, they add a little sodic phosphate or the neutral phosphate of alumina to the slimey liquors, with good results.

The iron of the machines and the pipe work in the concentrators becomes coated with a copper film, and is slowly eaten up by the water, owing to the presence of a little free acid and dissolved copper salts. Experiment has shown that the sulphide ores become oxidized during treatment, more especially is this noticeable on the jig screens. To counteract this evil, either burned lime is fed into the crusher with the ore, or as stated above milk of lime is added to the tailings launder. A careful analysis of the water in circulation was made, and the amount of lime necessary to neutralize the acid and salts present calculated. About 1,000 pounds of slaked lime are necessary to counteract the deleterious matter dissolved from 500 tons of ore per day. Since I started this practice at Morenci, the Arizona Copper Company and the Shannon Copper Company have followed the example. Aside from the benefit derived from the precipitate in helping to clarify the water, there is a marked saving in the repairs to the iron work of the mill.

#### *Milling Practice.*

It is very necessary to maintain an even grade of ore for successful operations. The ore being twice dumped, once at the ore bins at the mines, and then again into the stock bins at the concentrator, brings about a more or less complete mixture, but it is surprising how uneven the feed



is to the mills. While making an examination of the Shannon mill, I had hourly samples taken of the ore being fed into the trommels from the crusher, day and night, with a view of finding out how complete the mixing of the ore was. On January 21, 1904, my notes show the following results:

Hour.	Assay.	Hour.	Assay.
6 a. m....	3.14 per cent. Cu	6 p. m....	3.25 per cent. Cu
7 a. m....	3.92 per cent. Cu	7 p. m....	5.14 per cent. Cu
8 a. m....	3.45 per cent. Cu	8 p. m....	4.73 per cent. Cu
9 a. m....	3.28 per cent. Cu	9 p. m....	3.17 per cent. Cu
10 a. m....	3.20 per cent. Cu	10 p. m....	3.70 per cent. Cu
11 a. m....	4.03 per cent. Cu	11 p. m....	2.34 per cent. Cu
Noon .....	3.84 per cent. Cu	Midnight ..	4.45 per cent. Cu
1 p. m....	2.64 per cent. Cu	1 a. m....	3.25 per cent. Cu
2 p. m....	2.67 per cent. Cu	2 a. m....	4.70 per cent. Cu
3 p. m....	4.45 per cent. Cu	3 a. m....	3.00 per cent. Cu
4 p. m....	3.73 per cent. Cu	4 a. m....	4.39 per cent. Cu
5 p. m....	3.06 per cent. Cu	5 a. m....	3.14 per cent. Cu

Even greater differences than this have been noted, and with such a variable feed the machines have to be very closely watched and carefully adjusted. The Morenci and Clifton mills are more fortunate, as the percentage of oxides is not so great. Mr. Graybill, the superintendent of the Shannon, informs me that a grab sample taken from the feed from the belt showed that more than forty per cent. of the total copper was in the form of oxides.

As much of the fines should be screened out of the ore as possible before going to the crusher. A bumping screen feeding the rock breaker, having one and one-half inch perforations is found to give good results, the fines going directly to the trommels. The system of sizing in trommels and jigging each size on separate jig frames is the same as is adopted in all wet concentrating plants. At the present time, the Arizona Copper Company are testing a new appliance at their No. 3 mill. It is called a "Kangaroo jig" and so far, it has surpassed all that was expected of it. A rocking motion is imparted to the jig frame itself. It has a capacity of about thirty-five tons per hour, and will treat all material from five-eighths of an inch ring down. It can therefore be used for the products

of the Chilian mills, and if the tests continue to be satisfactory, it will revolutionize milling practice in the Clifton district. One machine does the work of about seven ordinary jigs, and it takes about five horse-power to run it, so that it has two attractive features, low consumption of power and great capacity. Clean concentrates are being obtained. As yet I have no data for publication, but the contrivance is attracting a great deal of attention in the district.

For the recrushing of the jig tailings, Huntington mills are used by the Arizona Copper and Shannon Copper Companies, while the Detroit Copper Company claim that the Bryan mill does the best work. The object is to prevent sliming as much as possible. It was my privilege some two years ago to make a comparison of the Bryan mill, Huntington mill and high speed rolls at the West Yankee and Longfellow concentrators, Morenci, which work resulted in the abandonment of high speed rolls for fine crushing. There is little to choose between the two types of Chilian mills.

The following table is a summary of a long series of tests made at Morenci, and is compiled by taking the average of some thirty different samples at different times from the three machines. The samples were dried before screening, no pressure was used in sieving the pulp, and even admitting that some small proportion was pulverized in the process, the error should be the same in all, therefore the figures given show the comparative merits of these three types of recrushing apparatus.

	Bryan Mills. %	High Speed Rolls. %	Huntington Mills. %
Left on 20 mesh.....	2.89	0.79	11.18
Left on 40 mesh.....	18.28	17.13	20.42
Left on 60 mesh.....	10.65	10.25	6.35
Left on 80 mesh.....	5.93	4.64	3.05
Left on 90 mesh.....	2.49	1.94	1.65
Left on 100 mesh.....	....	....	....
Left on 120 mesh.....	5.04	5.07	3.52
Left on 150 mesh.....	2.23	1.79	1.09
Left on 200 mesh.....	2.77	3.05	1.38
Through 200 mesh.....	49.69	55.31	50.94

The screen on the Bryan mills was  $1\frac{1}{2}$  millimetres.

The screen on the high speed rolls was 10 mesh.

The screen on the Huntington mill was  $2\frac{1}{2}$  millimetres.

Mr. Wallace of Morenci followed up my experiments by a series of wet screen analyses on the pulps from the different machines, which system I adopted in all the tests made while examining the Shannon concentrator recently. A number of samples were taken of each pulp at intervals of half an hour and all mixed together. Having drained off the surplus water, after allowing the suspended matter to settle, the pulp was slowly poured into a large funnel and a cut sample of the stream taken. This process was repeated until the bulk had been reduced sufficiently to be able to handle it conveniently in the laboratory. A jet of water was used to wash the pulp through the nest of screens, and the residues on each screen dried, weighed and assayed separately.

I am indebted to Mr. Wallace for the following tables:

**Bryan Mills, Detroit Copper Company, Morenci.**

Screen on mill  $2\frac{1}{2}$  mm., punched. October 20, 1903.

	Ozs.	West. % Wt.	Assay.	Cu in Sizes.	% Cu in Sizes.
Left on 20 mesh.....	2.625	11.95	0.6	7.17	6.60
Left on 30 mesh.....	2.375	10.80	0.67	7.24	6.67
Left on 40 mesh.....	2.375	6.25	0.85	5.31	4.92
Left on 50 mesh.....	1.250	5.68	0.92	5.23	4.82
Left on 60 mesh.....	2.000	9.10	1.00	9.10	8.38
Left on 70 mesh.....	0.625	2.84	1.08	3.07	2.83
Left on 90 mesh.....	1.250	5.68	1.31	7.45	6.86
Left on 120 mesh.....	1.250	5.68	1.65	9.36	8.63
Left on 150 mesh.....	0.750	3.41	1.88	6.42	5.92
Left on 200 mesh.....	0.500	2.27	2.13	4.83	4.44
Through 200 mesh.....	8.000	36.40	1.20	43.60	40.10

Sample assayed 1.04%

**Bryan Mills, Detroit Copper Company, Morenci.**

Screen on mill  $2\frac{1}{2}$  mm., punched. October 20, 1903.

	Ozs.	East. % Wt.	Assay.	Cu in Sizes.	% Cu in Sizes.
Left on 20 mesh.....	2.250	11.60	0.65	7.54	5.42
Left on 30 mesh.....	2.125	10.85	0.80	8.67	6.23
Left on 40 mesh.....	1.250	6.45	1.05	6.77	4.87
Left on 50 mesh.....	1.250	6.45	1.25	8.06	5.80
Left on 60 mesh.....	1.875	9.68	1.42	13.75	9.91
Left on 70 mesh.....	0.50	2.58	1.52	3.92	2.82
Left on 90 mesh.....	1.00	5.16	1.76	9.08	6.54
Left on 120 mesh.....	1.125	5.80	2.25	13.05	9.38
Left on 150 mesh.....	0.50	2.58	2.45	6.33	4.56
Left on 200 mesh.....	0.55	2.83	2.80	7.92	5.70
Through 200 mesh.....	7.00	36.10	1.50	54.20	39.00

Sample assayed 1.39%.



Screen analysis of the pulp issuing from the Huntington mills at the Longfellow concentrator gave the following results:

**Huntington Mills, Arizona Copper Company, Morenci.**

Screen on mill  $2\frac{1}{2}$  and 2 mm. October, 1903.

		Ozs.	% Wt.	Assay.	% Cu in Sizes.
Left on	20 mesh.....	5.125	15.30	0.95	11.30
Left on	30 mesh.....	4.000	11.95	0.99	9.22
Left on	40 mesh.....	2.000	5.95	1.09	5.08
Left on	50 mesh.....	1.625	4.85	1.25	4.76
Left on	60 mesh.....	2.000	5.97	1.54	7.18
Left on	70 mesh.....	0.875	2.61	1.72	3.51
Left on	90 mesh.....	1.000	2.99	1.94	4.53
Left on	120 mesh.....	1.375	4.11	2.35	7.58
Left on	150 mesh.....	0.875	2.61	2.92	5.94
Left on	200 mesh.....	0.625	1.87	2.89	4.22
Through	200 mesh.....	14.000	41.80	1.13	36.70

**Huntington Mills for Recrushing Vanner Tailings.**

Screen on mill  $1\frac{1}{2}$  and 1 mm. October, 1903.

		Grams.	% Wt.	Assay.	% Cu in Sizes.
Left on	20 mesh.....	42.50	7.98	0.71	6.72
Left on	30 mesh.....	71.00	13.30	0.72	11.32
Left on	40 mesh.....	37.60	7.05	0.82	6.85
Left on	50 mesh.....	28.40	5.33	0.89	5.63
Left on	60 mesh.....	42.50	7.97	0.91	8.60
Left on	70 mesh.....	13.70	2.57	0.95	2.89
Left on	90 mesh.....	23.58	4.42	0.99	5.18
Left on	120 mesh.....	22.25	4.17	1.02	5.05
Left on	150 mesh.....	14.00	2.63	1.11	3.46
Left on	200 mesh.....	10.85	2.04	1.22	2.96
Through	200 mesh.....	227.00	42.60	0.82	41.50

In November last a dried sample of the pulp from the Huntington mills of the Shannon concentrator was sent to Morenci for analysis, and the following results obtained:

**Huntington Mill, Shannon Concentrator.**

Sample taken, dried and sent to Morenci for analysis, November 15, 1903.

Screen 1 mm., punched (old).

		Grams.	%	Assay.	Cu in Sizes.	% Cu in Sizes.
Left on	20 mesh.....	8.100	1.83	0.55	1.01	0.645
Left on	30 mesh.....	42.986	9.62	0.8	7.70	4.920
Left on	40 mesh.....	39.816	8.98	1.00	8.98	5.730
Left on	50 mesh.....	31.568	7.12	1.25	8.90	5.670
Left on	60 mesh.....	45.316	10.22	1.50	15.30	9.750
Left on	70 mesh.....	13.170	2.97	1.75	5.20	3.310
Left on	90 mesh.....	22.383	5.05	2.10	10.60	6.760
Left on	120 mesh.....	23.333	5.26	2.75	14.45	9.220
Left on	150 mesh.....	11.800	2.67	3.45	9.20	5.870
Left on	200 mesh.....	9.700	2.19	3.45	7.56	4.810
Through	200 mesh.....	194.830	44.00	1.55	68.20	43.400

Assay of sample 1.60%.

# CONCENTRATION OF COPPER ORES IN THE SOUTHWEST. 97

Analysis:	SiO <sub>2</sub> .....	% 66.50
	CaO .....	0.20
	Fe .....	3.50
	MgO .....	1.44
	Al <sub>2</sub> O <sub>3</sub> .....	16.70
	S .....	2.16
	Cu .....	1.60

The results I obtained from wet screenings of the Huntington mill product at the Shannon are given below:

## Huntington Mills, Shannon Concentrator.

Screen 1 mm., punched plate; ½ hourly samples. January 19th.

	Grams.	%	% Cu
Left on 20 mesh.....	10.106	2.55	0.74
Left on 30 mesh.....	43.114	10.89	0.92
Left on 40 mesh.....	30.412	7.74	1.07
Left on 60 mesh.....	55.813	14.10	1.51
Left on 80 mesh.....	6.113	1.54	1.86
Left on 100 mesh.....	19.04	4.81	2.04
Left on 120 mesh.....	23.787	6.02	2.67
Left on 150 mesh.....	10.062	2.54	2.12
Left on 200 mesh.....	10.105	2.55	5.22
Through 200 mesh.....	187.04	47.33	1.68
Totals .....	395.592	100.07	

Screen 1 mm., punched plate. January 20th.

	Grams.	%	% Cu
Left on 20 mesh.....	.897	0.23	....
Left on 30 mesh.....	34.862	9.18	0.7
Left on 40 mesh.....	35.450	9.33	0.85
Left on 60 mesh.....	61.679	16.23	1.11
Left on 80 mesh.....	9.363	2.46	1.27
Left on 100 mesh.....	12.455	3.27	1.83
Left on 120 mesh.....	23.317	6.13	2.51
Left on 150 mesh.....	7.626	2.07	3.15
Left on 200 mesh.....	8.675	2.28	3.52
Through 200 mesh.....	185.550	48.84	1.73
Totals .....	379.874	100.02	

Screen 1½ mm., slotted wire cloth; ½ hour samples for 6 hours.  
January 26th.

	Grams.	%	% Cu
Left on 20 mesh.....	48.780	15.08	0.78
Left on 30 mesh.....	52.365	16.19	0.98
Left on 40 mesh.....	26.680	8.25	1.12
Left on 60 mesh.....	39.735	12.29	1.44
Left on 80 mesh.....	4.440	1.37	1.85
Left on 100 mesh.....	12.595	3.89	1.88
Left on 120 mesh.....	11.735	3.63	2.48
Left on 150 mesh.....	5.715	1.76	3.06
Left on 200 mesh.....	5.960	1.84	2.85
Through 200 mesh.....	115.300	35.66	1.29
Totals .....	323.305	99.96	

Slotted wire cloth is of little use on a regrinding mill. After a few hours the wires become worn and a coarse product is obtained. An examination of the pulp left on a 20 mesh screen of the last test made showed particles measuring from two and one-half to three millimetres diameter. A heavy punched plate screen is the best. The heavier the screen the longer its life, and the more even the size of the product. A fine screen produces too much slime and it is only by such a series of tests as has already been described that the most suitable size screen can be determined. A difference of twelve per cent. of the total sample is noticed in the impalpable slime passing through a 200-mesh, between a machine using one mm. screens and another using one and one-half mm.

The marked difference in the assay value of the pulp left on a 200 mesh screen and that of the powder passing through is particularly interesting. I am at present undecided as to the cause of this pronounced falling off in the values, but it may be accounted for by the difference in the hardness of the oxides, silicates and sulphides.

It will also be noticed that there is a very decided increase in the amount of slime passing through a 200 mesh screen to that left on a 200 mesh, which may be explained by the theory that as soon as the rollers touch the rock it is immediately pulverized. There is no slow grinding action, the harder particles remain coarse and the balance is reduced to an impalpable powder immediately. This interesting point also shows that such machines clear themselves very rapidly, otherwise one would expect to find a gradual increase in the percentage of the whole, left on the several screens. After the sixty mesh size has been reached, there is only about twelve per cent. of the total found on the screens up to 200 mesh.

Having recrushed the material, close classification of the various sizes is necessary to ensure clean concentration. The pulp issuing from the mill is run into a long modified spitzkasten, having a number of compartments from which the several sized products are drawn off and conveyed to one or other of the machines by launders. Too



much attention cannot be paid to this important point. No machine can handle satisfactorily a pulp containing particles varying from 20 to 200 mesh. Close classification of the sizes is the keynote of successful concentration, and the classifiers should be made large enough to handle all the products of the mill whether using a two and one-half or a one mm. screen. Ample provision should be made so that in the event of an increased output from the mill, an equally clean and close classification will be obtained. The folly of having the classifiers too small can be seen from the following table giving the results of a month's run at one of the concentrators to which my attention was called. Only a small classifier was installed between the two five-foot Chilian mills and the vanners, quite inadequate for the work it was called upon to do, and on putting in a one and one-half mm. slotted wire cloth screen, after a few hours, when the screen began to wear, the vanners were crowded with a pulp of all sizes, dirty work resulted, the tailings ran away up in their copper contents, and the concentrates would not assay eleven per cent. copper.

Date.	Raw Ore.		Huntington Feed.	General Tailings.	
	Day.	Night.		Day.	Night.
1 .....	3.70	3.04	1.50	0.78	0.65
2 .....	3.20	....	1.62	0.78	....
3 .....	3.29	....	1.76	0.67	....
4 .....	3.18	3.34	1.80	0.79	1.19
5 .....	3.20	3.68	1.62	1.17	0.77
6 .....	2.88	3.93	1.74	0.93	0.82
7 .....	2.60	2.72	1.58	0.88	0.76
8 .....	4.51	....	1.72	0.77	0.72
9 .....	4.30	3.87	1.61	0.86	0.68
10 .....	4.63	5.19	1.43	0.94	0.96
11 .....	2.97	3.50	1.57	0.82	0.85
12 .....	3.46	3.96	1.74	0.94	0.84
13 .....	3.93	3.54	1.61	1.00	0.95
14 .....	2.61	3.93	1.12	0.80	0.67
15 .....	3.60	3.96	1.44	1.73	1.89
16 .....	3.85	....	1.32	1.04	....
17 .....					
18 .....	3.14	3.21	2.36	0.84	1.00
19 .....	3.47	2.86	1.24	0.88	1.09
20 .....	3.45	3.32	1.63	0.92	1.04
21 .....	3.45	3.77	1.67	1.11	1.41
22 .....	4.00	2.90	1.49	0.92	1.24
23 .....	3.61	3.66	1.58	1.02	1.21
24 .....	2.93	3.83	1.68	0.99	1.06
25 .....	3.86	3.67	1.39	1.00	1.13
26 .....	2.86	3.65	1.24	0.90	0.91
27 .....	2.70	3.60	1.59	1.14	1.01
28 .....	3.80	4.11	1.54	0.89	1.03

The wire cloth screen was put on on the afternoon of the 19th.

At the West Yankee concentrator the coarser products from the classifier are taken to fine jigs on one side of the mill and to Bartlett tables on the other side. The fine jigs do excellent work. A screen analysis of the Bartlett tailings shows how efficient these classifiers are, over seventy-one per cent. of the whole being coarser than forty mesh.

*Upper Bartlett Tailings.*

		Grams.	%	% Cu
Left on	10 mesh.....	Trace		
Left on	20 mesh.....	64.6	18.94	.82
Left on	40 mesh.....	179.2	52.56	.91
Left on	60 mesh.....	23.4	6.86	.69
Left on	80 mesh.....	6.3	1.84	.86
Left on	100 mesh.....	.....	....	....
Left on	120 mesh.....	.....	....	....
Left on	150 mesh.....	9.4	2.75	1.20
Left on	200 mesh.....	1.1	.32	....
Through	200 mesh.....	55.5	16.39	1.56

Equally good results are obtained at the Arizona Copper Company's concentrators, where Frue vanners with corrugated belts are used for the coarse materials. At the Shannon mill I found it impossible to get a representative sample of the coarse feed to the vanners, but the screen analyses of the tailings show that the classifiers do good work. When using a one mm. punched plate screen on the mills, seventy-seven per cent. of the tails from the coarse vanners will remain on a sixty mesh sieve; with a one and one-half mm. slotted wire screen eighty-seven per cent. remains on a sixty mesh, but sixty-four per cent. of the total will be found on a thirty mesh sieve. The quantity of slime is approximately the same in each case, only eight per cent.

*Coarse Vanner Tailings.*

**Using Corrugated Belts; Shannon Concentrator.**

Screen 1 mm., punched;  $\frac{1}{2}$  hour samples for 6 hours. January 20th.

		Grams.	%	% Cu
Left on	20 mesh.....	14.058	4.11	0.66
Left on	30 mesh.....	76.664	22.41	0.72
Left on	40 mesh.....	57.202	16.71	0.89
Left on	60 mesh.....	115.959	33.89	0.99
Left on	80 mesh.....	12.860	3.76	0.95
Left on	100 mesh.....	19.602	5.73	0.94
Left on	120 mesh.....	13.934	4.07	0.70
Left on	150 mesh.....	3.773	1.10	....
Left on	200 mesh.....	3.160	0.93	....
Through	200 mesh.....	24.920	7.28	1.38
Totals	.....	342.132	99.99	

# CONCENTRATION OF COPPER ORES IN THE SOUTHWEST. 101

Screen 1½ mm., wire cloth; ½ hour samples for 6 hours. January 26th.

		Grams.	%	% Cu
Left on	20 mesh.....	112.325	32.53	0.68
Left on	30 mesh.....	113.645	32.91	1.74
Left on	40 mesh.....	32.745	9.48	1.72
Left on	60 mesh.....	42.205	12.22	0.80
Left on	80 mesh.....	2.990	0.87	....
Left on	100 mesh.....	5.415	1.57	0.89
Left on	120 mesh.....	4.355	1.26	0.96
Left on	150 mesh.....	1.685	0.48	....
Left on	200 mesh.....	1.565	0.45	....
Through	200 mesh.....	28.40	8.22	1.03
Totals .....		345.335	99.99	

At the Shannon concentrator the tailings from the vanners are not retreated as in the West Yankee and Longfellow mills. A microscopic examination of the concentrates and coarse tailings from these vanners would be of value to determine whether further reduction in size would give increased extraction. Whether the low copper contents and the high silica of the concentrates obtained is due to different sized particles of quartz and mineral being washed over together, or to a large proportion of middlings, is a question not easy to answer without a microscopic examination. If the latter explanation is correct, then finer crushing should be resorted to; if the former, then more vanners and less feed to each is the solution of difficulty.

Corrugated belts are far superior to plain rubber belts for the concentration of coarse material.

The slime vanners of the Shannon are doing good work. On January 27, 1904, the feed assayed 1.68 per cent., while the tailings showed 0.91 per cent. copper, which is an extraction of 45.83 per cent. A clean concentrate is also obtained, that on January 26th assayed 16.17 per cent. copper. From the following screen analysis it will be seen that 98.24 per cent. of the total readily passes through a 200 mesh sieve, which means that most of it is in the form of the finest slime.

## Slime Vanners, Shannon Concentrator.

		Grams.	%	% Cu
Left on	20 mesh.....	.....	....	....
Left on	30 mesh.....	.....	....	....
Left on	40 mesh.....	.....	....	....
Left on	60 mesh.....	.....	....	....
Left on	80 mesh.....	.....	....	....
Left on	100 mesh.....	.....	....	....
Left on	120 mesh.....	.....	....	....
Left on	150 mesh.....	0.64	0.45	....
Left on	200 mesh.....	1.84	1.30	....
Through	200 mesh.....	138.51	98.24	1.13
Totals .....		140.99	99.99	



The tailings from the Bartlett tables and the fine jigs at the West Yankee mill, together with the tailings from the vanners treating the intermediate sized products, and the slimes from the hydraulic classifier below the recrushing mills are all retreated on a series of vanners on the lower vanner floor, where a last effort is made to extract the values. During the month of June, 1901, the average extraction obtained on the slime vanners amounted to 64.0 per cent. Screen analysis of the feed and tailings from these vanners showed:

		Feed.			
			Grams.	%	% Cu
Left on	80 mesh.....		1.65	1.19	....
Left on	100 mesh.....		1.30	0.22	....
Left on	150 mesh.....		5.50	3.93	0.98
Left on	200 mesh.....		2.10	1.52	....
Through	200 mesh.....		128.40	93.07	1.70
<hr/>					
		Tailings.			
Left on	80 mesh.....		2.10	1.67	....
Left on	100 mesh.....		0.80	0.63	....
Left on	150 mesh.....		7.70	6.12	0.40
Left on	200 mesh.....		1.10	0.87	....
Through	200 mesh.....		114.00	90.69	1.00

All kinds of schemes and appliances have been tried to see if it is possible to obtain a higher extraction from these slimes, but so far it is next to impossible to reduce the copper contents of the general tailings below 0.7 per cent. About two years ago an elaborate series of tests was carried out at Morenci to see what type of machines gave the best results. A circular tank, divided into quadrants, each compartment feeding a different machine; received the tailings from the upper vanner floor through a number of revolving arms radiating from a central pipe, so that each compartment got exactly the same feed. The machines tested were the Wilfley table, the Overstrom table, the Llewellyn table and the plain belt Frue vanner, each one being handled by a man sent out specially from the several factories to look after them. The trial extended over a number of weeks, and while I am not able to obtain full records of the test it is significant that to-day only Frue vanners are being used. I am told that they not only had the greatest capacity, but they did the cleanest work.

The tailings from the lower vanner floor are all

brought into a common launder, and so run to waste. It is a very difficult matter to obtain an average sample of the tailings from the Shannon concentrator, as the stream is so strong, and the launder so small. The following tables represent as nearly as possible the screen analysis of representative samples:

**General Tailings, Shannon Concentrator.**

Cut sample. January 20th.

		Grams.	%	% Cu
Left on	20 mesh.....	0.635	0.78	
Left on	30 mesh.....	8.564	10.51	
Left on	40 mesh.....	7.577	9.30	
Left on	60 mesh.....	9.548	11.72	
Left on	80 mesh.....	1.078	1.32	Not
Left on	100 mesh.....	2.777	3.41	As-
Left on	120 mesh.....	2.526	3.10	sayed
Left on	150 mesh.....	1.817	2.23	
Left on	200 mesh.....	1.663	2.04	
Through	200 mesh.....	45.265	55.57	
Totals	.....	81.450	99.98	

One-half hour samples for 6 hours. January 20th.

		Grams.	%	% Cu
Left on	20 mesh.....	4.666	1.09	0.50
Left on	30 mesh.....	35.217	8.23	0.56
Left on	40 mesh.....	35.135	8.21	0.67
Left on	60 mesh.....	65.844	15.39	0.77
Left on	80 mesh.....	5.107	1.19	0.74
Left on	100 mesh.....	19.598	4.58	0.64
Left on	120 mesh.....	16.505	3.86	0.58
Left on	150 mesh.....	9.715	2.27	0.61
Left on	200 mesh.....	9.481	2.21	0.78
Through	200 mesh.....	226.600	52.95	1.44
Totals	.....	427.868	99.98	

**General Tailings, Shannon Concentrator.**

Coarse screen; hourly samples for 12 hours. January 26th.

		Grams.	%	% Cu
Left on	20 mesh.....	28.058	7.32	0.57
Left on	30 mesh.....	65.360	17.03	0.68
Left on	40 mesh.....	37.205	9.70	0.73
Left on	60 mesh.....	65.18	16.99	0.86
Left on	80 mesh.....	9.61	2.55	0.75
Left on	100 mesh.....	21.145	5.51	0.74
Left on	120 mesh.....	14.340	3.74	0.87
Left on	150 mesh.....	6.920	1.80	0.98
Left on	200 mesh.....	6.595	1.72	1.10
Through	200 mesh.....	129.150	33.67	1.32
Totals	.....	333.600	100.03	

The Shannon Company are fortunate in having the San Francisco river running by their reduction works, so that it is not necessary for them to economize as the De-

troit Copper Company have to do. For this reason there is no elaborate system of settlers, the tailings run directly from the vanners into the river below.

At the West Yankee concentrator, where it is necessary to save as much water as possible and return it to the mill, the tailings are made to pass through a number of tanks, and as much solid matter as will, is allowed to settle. Figure 3 shows the arrangement of the tail race. In the larger tanks the current is very slow indeed, and the water returned to the mill is practically clear. The coarser particles settle very readily, but the slimes float down in the last tanks. I took a number of samples of the settlings from each tank and screened them with the following results:

Sample A—

		%	% Cu
Left on	15 mesh.....	3.46	.3
Left on	20 mesh.....	20.3	.5
Left on	30 mesh.....	36.14	.55
Left on	60 mesh.....	32.67	.55
Left on	80 mesh.....	3.21	.38
Left on	100 mesh.....	2.23	.48
Left on	120 mesh.....	.28	.6
Through	120 mesh.....	1.73	1.3

Total, 6 lbs. 5 ozs.

Sample B—

		%	% Cu
Left on	20 mesh.....	1.07	.6
Left on	30 mesh.....	8.60	.47
Left on	60 mesh.....	39.79	.32
Left on	80 mesh.....	10.71	.26
Left on	100 mesh.....	23.65	.41
Left on	120 mesh.....	1.07	.42
Through	120 mesh.....	15.05	1.08

Total, 1 lb. 7 ozs.

Sample C—

		%	% Cu
Left on	60 mesh.....	20.73	.27
Left on	80 mesh.....	9.75	.25
Left on	100 mesh.....	25.61	.3
Left on	120 mesh.....	3.66	.32
Through	120 mesh.....	40.24	.85

Total, 1 lb. 4 ozs.

Sample D—

		%	% Cu
Left on	60 mesh.....	6.06	.3
Left on	80 mesh.....	4.54	.23
Left on	100 mesh.....	22.72	.27
Left on	120 mesh.....	6.06	.3
Through	120 mesh.....	72.72	1.3

Total, 8¼ ozs.



## Sample E—

	%	% Cu
Left on 80 mesh.....	1.54	.3
Left on 100 mesh.....	3.07	.5
Left on 120 mesh.....	3.07	.3
Through 120 mesh.....	92.32	.86

Total, 8½ ozs.

## All Through 120-Mesh Sieve—

	% Cu		% Cu
F .....	.87	P .....	.92
G .....	.90	Q .....	.97
H .....	.89	R .....	1.00
I .....	.99	S .....	1.15
J .....	.94	T .....	1.10
K .....	.90	U .....	1.11
L .....	.90	V .....	1.02
M .....	.95	W .....	1.04
N .....	.93	X .....	.96
O .....	.96		

*Average Copper Contents of Tailings 0.68 Per Cent.*

From the copies of the monthly reports of the Detroit Copper Company's mill, given earlier in this paper, it will be seen that from \$16,000 to \$17,000 per month are lost in the general tailings, the greater part of which is in the fine slimes. I figure the loss to the Shannon Copper Company from this same source to be about \$9,000 per month. With such heavy losses, a very careful watch must be kept to prevent the tailings running high in copper values, and constant sampling will alone give the information required. Mr. Hunt of the Detroit Company's mills has designed a very ingenious apparatus for automatically sampling the tailings. Set up in the tail race is an undershot water wheel which is geared with a shaft on which is keyed, at one end a segment of a toothed wheel. It is so arranged that every two minutes this segment shall engage with another spur wheel keyed to a shaft on which a long narrow trough is fixed. As the trough revolves it cuts a sample clean across the tailings stream and diverts it into another channel and so to the sample tanks below. Every shift this sample vat is siphoned off, the pulp put into a filter press and squeezed, the cake is dried on a brick fire, and the requisite amount of pulp taken for assay. A Scobey sampler was also put in to check Mr. Hunt's appliance, and the difference between the daily returns for one month's work was inappreciable.

In 1901 I commenced a series of experiments on oil

concentration in the laboratory. I was able to extract thirty-five per cent. of the copper values from the tailings, but I had not the proper oils at my disposal. Mr. Wallace, in following up my work, got better results. The finest slime on which he experimented assayed one and twelve-hundredths per cent. total copper, seventy-five-hundredths per cent. sulphides and thirty-seven-hundredths per cent. oxides. After a prolonged agitation with a crude oil of nine-tenths specific gravity, he obtained an extraction of seventy-nine per cent. of the total value, which means that some of the oxides were taken up by the oil, together with all the sulphides. This is a surprising result, as the minute grains of chalcocite have an earthy surface, which does not lend itself to the selective action of the oils. However, the company were so encouraged by the results obtained that they erected a two-unit mill to test the process on a larger scale. It was proposed to treat only the finest slimes. The tests were a decided failure, and after repeated trials under competent supervision the apparatus was torn down and discarded.

The disposal of the tailings is becoming a very serious question in the district for reasons already given, but up to the present time no solution of the difficulty has presented itself. To utilize the coarser tailing as filling in the stopes has been tried, but the cost of handling is prohibitive; then it has been proposed to build an immense dam across Chase creek and so keep them from going down the river. Such a scheme is reasonable, but with the periodic cloudbursts, no dam could withstand the pressure of these thousands of tons of tailings together with the great quantity of water that rushes down the canyons. Mr. Colquhoun is building a number of large concrete settling tanks to drain off the water from the tailings and allow them to solidify. He anticipates a fair measure of success. At the Shannon plant the proposition may be solved. The slag dump is being slowly carried out across the gulch, into which all the tailings drain, and it is only a matter of time when an enormous slag dam will stop the passage of the tailings into the river. The molten slag as it is poured from the moulds

mixes with the tailings already in the gulch and forms a very solid rock mass. It is an inexpensive method and may be effective in this one case, for the gulch into which the tailings are run is not a main drainage channel of the district, and even though a cloud burst occurred in the vicinity, in all probability the water would travel another gulch.

*Concentrates.*

To produce a clean product at minimum expense is the object of mill work; to produce from lean ores a rich concentrate is the aim of the mill man. It is impossible to smelt a three per cent. ore at a profit, but if by any cheap mechanical means we can concentrate five tons of ore down to one ton of concentrates, we have a product suitable for furnace work. Especially is this the case in the blast furnace practice of copper metallurgy. The copper, sulphur and iron are necessary for the production of copper matte, and the economical mining and milling of these low grade sulphide ores has made bessemerizing possible, with the result that the output of pig copper from the Clifton-Morenci district approximates to ninety tons per day.

The concentrates obtained in the Shannon mill are somewhat siliceous. A partial analysis made by Mr. Bradlee in November last, showed:

	%	%
Copper .....	17.5	17.0
Iron .....	15.4	16.7
Silica .....	35.1	29.1
Sulphur .....	19.5	20.95
Alumina .....	9.3	9.1

I made several panning tests of these concentrates from the coarse vanners and was able to reduce the percentage of silica very considerably, and the idea has been suggested that it might be well to re-concentrate the concentrates on a Wilfley table or some such machine. This is a matter for experiment.

The concentrates obtained from the West Yankee mill are much cleaner, but then they have not got the complex ore of the Shannon mine to treat. Extracts from two of the monthly reports show:



	April, 1901.	June, 1901.
	% Cu	% Cu
Coarse jig concentrates.....	30.87	22.40
Fine jig concentrates.....	21.00	17.45
Upper vanner concentrates.....	19.10	16.00
Lower vanner concentrates.....	18.27	14.70

All the concentrates obtained from the several mills are treated in the same way. They are taken to the smelter and briquetted with the flue dust from the furnaces and the fine screenings of the first-class ore. The Chisholm, Boyd & White briquetting press is used by each company, and it turns out a hard, compact brick. No binding material is added to the mixer. As the bricks are taken off the belt of the machine they are stacked up on the feed floor, and shoveled into the furnace without any attempt to dry them out. They do not disintegrate in the furnace readily.

The cost of milling a ton of ore in the district is remarkably low, considering what water costs. At Morenci the milling cost per ton of ore amounts to sixty cents.

Before concluding, I should point out the necessity of sampling all the mill products, as it is only in this way that a mill man can obtain accurate knowledge of his work. All products should be sampled at least once every shift, and daily reports made. It is a very simple matter, takes very little time and requires no additional help. In Morenci the results of the month's work is averaged and returned as follows:

West Yankee Concentrator. June, 1901.

	% Cu	West. %	East. %
Crude ore .....	4.20	....	....
General tailings .....	0.75	....	....
Upper vanner tailings.....		0.60	0.54
Lower vanner feed.....		1.98	0.83
Lower vanner tailings.....		0.71	0.65
Jig tailings .....		0.77	....
Lower Bartlett feed.....		0.97	1.39
Lower Bartlett tailings.....		0.94	0.69
Lower Bartlett concentrates.....		9.93	11.15
Upper Bartlett tailings.....		....	0.67
Coarse jig concentrates.....		....	22.40
Fine jig concentrates.....		....	17.45
Upper vanner concentrates.....		....	16.00
Lower vanner concentrates.....		....	14.70
(Fines, 8.59%).			

In this brief description I have attempted to give a general outline of the concentrator practice of the Clifton-

Morenci district, thinking that the methods adopted, and lines of research suggested, would be of interest to the members of this Congress. While I have not been able to treat the subject fully, I trust the information given will be of service to the profession, and will promote a lively discussion. When treating low grade ores every particular must be carefully thought out, and economy practiced in all branches.

## The Ryan Electro-Magnetic Concentrator.

BY JOHN H. RYAN.

For twenty-five years or more there has been a great diversity of opinion among mining men as to the best and most practical method of extracting gold and other metals that are known to exist in most of the rivers, and along the beaches of the Pacific Coast.

It is an undisputed fact that in many of the rivers heading in the Rocky and Coast Range mountains, and in a great many locations along the Pacific Coast, the sands carry gold in greater or lesser quantity.

Although, during this period of time, innumerable experiments have been made with different devices to extract these gold values none of these ever proved to be practicable and satisfactory.

There was always a deterring element that prevented the recovery of the gold. Some of these experimenters, after long and tedious work, finally found that all, or nearly all, of these sands carried what is commonly known as "black sand," technically known as "magnetic iron;" this iron is sometimes associated with manganese in combination. This "black sand" or "magnetic iron" is found in the form of very fine crystals, being exceedingly fine, almost an impalpable powder; and this "black sand" was the deterring element that all of these experimenters had to contend with.

The gold that is contained in the sand is also very fine, having undergone a grinding process and erosion by the elements, as it has been carried from the quartz ledges in the mountains where it was originally deposited by nature, down the course of the rivers to the ocean, where it has been washed up on the beaches in deposits with more or less of the black sand.

It is an indisputable fact, that wherever a deposit of black sand has been found, gold will also be found in more or less quantity.



Within the last few years efforts to recover the gold known to exist in various deposits of sand along the beaches of Oregon and California have practically been abandoned. The reason for this abandonment is the inability to save the gold values with any of the known devices invented for this purpose. In many of the dredges that are being operated, they lose more than one-half of the values contained in the sand, owing to this deterring element, "magnetic iron."

It is the consensus of opinion of many of those who have experimented with the beach and river sands, that the gold is held in combination with the magnetic iron and could not be saved, and with this knowledge they gave up.

With practically all of these devices in the past they were built on some plan of sluicing, and when an effort to clean up was made, the riffles would be found to contain principally black sand. Assays of this product would show gold values, but all efforts to separate the gold from this black sand were unavailable, and in consequence of this state of things many came to the conclusion that the iron held the gold in combination. Then came different experiments to extract the gold from the black sand, with indifferent results.

It is the firm opinion of the writer that the two go together, but that they are separate and distinct as far as any amalgamation of the two are concerned. The black sand or magnetic iron being very fine, and the gold also being very fine, perhaps in most instances particle for particle, they are almost the same molecular weight, or near enough so, that when sluiced they form very close concentrate, practically eradicating all other substances, and the iron holding the gold so closely together that it was impossible to amalgamate the gold. Some operators have claimed that the gold was "flake" or "flour" gold, and would always float on the water, consequently could not be amalgamated. This to a certain degree I do not think correct. It is my opinion that the gold is free when eradicated from the deterring element the "black sand" and also that the gold can be amalgamated without any difficulty when freed

from the black sand. Out of this chaos a new order of things has evolved; with the advent of a new invention, the Ryan Electro-Magnetic Concentrator, this deterring element, the black sand or magnetic iron, can be separated from the sand by itself, and become an article of commercial utility. Magnetic iron is the finest iron in the world, and commands a price of \$22.50 to \$30 per ton when reduced to pig iron.

After the sand has passed through the Magnetic Concentrator and the magnetic iron having been taken from it, the sand with the deterring element removed is ready for the amalgamator, when the gold values may be recovered with a proper amalgamating apparatus. Thus the Electro-Magnetic Concentrator will open up a field that has been practically abandoned, and will produce an article of commerce that is much needed on this coast, as well as opening up a field for the recovery of gold, that is practically unlimited. For it is a proven and demonstrated fact that there are large deposits of gold and iron-bearing sands along the Oregon and California coasts; also some are known to exist inland in both states. Then again, it is known that the sand in the Snake and upper Columbia rivers, also the Klamath and several rivers in California, carry good values in gold, and the same trouble has been encountered in trying to save the values in these rivers, as on the beaches; and all efforts are only a partial success.

With the use of the Ryan Electro-Magnetic Concentrator all of the values may be saved at a very small cost of operation, leaving very liberal and handsome profits for the operators.

## Geology and Mineral Resources of Wyoming.

HENRY C. BEELER, STATE GEOLOGIST, CHEYENNE, WYOMING.

For the past thirty years the impression has gone forth among mining men throughout the West that Wyoming was only good for a cattle pasture and that it was useless to spend any time in looking for the precious metals within her borders, so the majority of the mining profession have simply looked wise when Wyoming was mentioned and carefully avoided anything like an investigation of her geology and mineral resources, regardless of the fact that her neighbors on all four sides have been remarkable for their increasing production of all the economic minerals.

It appears to be characteristic of all the states around Wyoming that their minerals are confined to one well defined belt extending through some portion of the state and the various camps connected by ranges of mountains with their main characteristics similar in each case. In Wyoming, however, this is not the case, as minerals noted within our borders have been found all over the state, from one corner to the other, as the whole area of 97,890 square miles contributes its quota to the mineral wealth of the state, but development has been backward and has only taken place in those localities most readily accessible or best advertised and the work has been confined to a very limited area as compared with the total area of the state. Geologically the main feature of the state is the chain of mountains which extends across the Grand Encampment region, in southern Carbon county, where the Sierra Madre and Medicine Bow mountains appear, northwesterly across the state taking in the Wind River Range and including the Absaroka mountains southeast of the Yellowstone National Park, and, strange as it may seem, the major portion of this main uplift remains unexplored from a mineral standpoint, even though the great Sweetwater Mining Region, better known as the South Pass Country, lies directly on this line. East of the northern portion of this range is



the Big Horn Basin uplift containing similar general features, and southeast of the Big Horn occurs the Laramie Hills and Laramie Peak region, whose general features are also similar to the main Wind River uplift.

In the northeastern corner of the state, the western edge of the Black Hills of South Dakota extend into Wyoming for many miles and the famous Nigger Hill Placers were found in this locality, though little has been done toward developing the leads at this point until very recently.

West of the Wind River ranges is the Teton Country, where numerous ranges of smaller uplifts have been giving up copper specimens for many years, though this region seems to be left to the game and to forest reserves.

In the country lying east of these main ranges and the better known portion of the state are numerous small uplifts and ranges and in some of these some of the most extensive mineral deposits of the state are found, notably the Hartville and Whalen Canon uplift where the Sunrise iron mines are being developed.

About six years ago a townsite boom was started at the forks of the Grand Encampment River in Southern Carbon county, forty-four miles south of the main line of the Union Pacific Railroad, on the strength of a few extraordinarily rich gold specimens found in Purgatory Gulch in that vicinity. Prospectors flocked in and the gold boom apparently exploded in a very short time, but in the mean time the famous Ferris-Haggarty Copper mine had been found, sixteen miles west of the townsite.

The old Doane-Rambler Copper mine was being worked again and the new Rambler mine was opened up in the Medicine Bow Mountains east of the Encampment and attention was turned to copper with the result that there are fifty steam plants now operating in this vicinity. A smelter and concentrating works has been erected and is now in operation, constructed on a 500-ton capacity basis and now produces a car of blister copper per day. A tramway was built from the smelter to the Ferris-Haggarty mine (sixteen miles) and most of the ore for the smelter

comes from the Ferris-Haggarty mine. This mine is a huge contact deposit between schist and quartzite and most of the successful properties of this region have been found in deposits of this character, (secondary deposits) though a number of other properties in which the ores are found in the original formation, (primary deposits) as the Verde Mine, south of Battle, and the New Rambler Mine already mentioned, which seems to be a series of fissures in dioritic granites are exceptions to this general rule.

The general formation of the Encampment Country is a fine grained Algonkian schist with bands of diorite and allied rocks and quartzites lying therein, and there are some limited exposures of granite in the Battle Lake and New Rambler vicinity. In these formations the same general characteristics of a heavy oxidized iron cap has been noted in every instance where successful operations have been conducted, this condition being especially marked on the Ferris-Haggarty, Doane-Rambler, and New Rambler mines. These same general conditions, in a lesser degree perhaps, are noted at a dozen other points in the state where copper prospecting is now going on, especially in the Silver Crown district near Cheyenne; in the North Laramie Peak district, near Douglas in the east-central portion of the state; at Copper mountain near Thermopolis and at several other points in the Wind River range. At each of these points there are many strong indications that with proper development a number of profitable camps will be opened up.

Nearly forty years ago the South Pass Gold Mines and Placers were the talk of the mining profession and the surface showings were certainly remarkable, but as all the work of this district was confined to comparatively few high grade lenses and work was promptly stopped when water level was reached, mining men in general became convinced that the Sweetwater mines were merely surface showings and were a good thing to keep away from. Recently, however, a more sane view has prevailed and a number of experienced, practical mining men have taken up the development of several prominent properties, nota-

bly the Carissa at South Pass, which produced millions in the old days from a very limited portion of its territory. The greatest depth yet obtained on the Carissa is about 400 feet and a crosscut has been run across the adjacent crystalline schists, which include the original lenses of high grade ore, for a distance of 180 feet has shown a number of extraordinary conditions and demonstrated beyond a doubt that the ore bodies of the South Pass District are great bodies of low grade free milling ore, as tests on this crosscut show an average mill value of \$6 per ton for the whole 180 feet.

There are a number of other works in the vicinity, notably the Dexter crosscut tunnel at Atlantic, four miles from South Pass, now being run to cut a number of rich leads worked in the old days. This tunnel has cut three blind leads in the length of 300 feet, and conditions similar to those noted at the Carissa have been shown.

The South Pass District is an island of metamorphic fine grained schists, about thirty miles long and from twelve to fifteen miles wide and is practically virgin ground, the deepest work being the Carissa, which is down 400 feet, as before mentioned.

The country immediately surrounding the National Park has been condemned by numerous mining men, but the development of the past four years in this vicinity has shown that these formations which have been so universally derided as mineral producing, contain profitable minerals, and are being opened up by men who are willing to take long chances in a virgin field and they are being rewarded for their efforts.

At Kirwin, on Wood River, southwest of Meeteetse, on the south fork of the Shoshone and at Sunlight Basin, northwest of Cody, works are being constructed with showings that compare very favorably with a number of prominent properties in other states, gold, silver, lead and copper being the minerals opened up.

The fuel resources of Wyoming are perhaps better known than any other of the mineral resources of the state, but many will be surprised to know that the workable coal



area of Wyoming is conservatively estimated at 20,000 square miles, only a very small portion of which has been developed, and that each county of the state, each mining district, each agricultural section has been amply provided with a suitable fuel in sufficient quantities to take care of all demands for generations. The standard of Wyoming coal is and has been the Rock Springs coal from the Union Pacific railroad mines and a number of other properties of similar grade have been opened up all over the state, the total production for coal for the year 1903 amounting to 4,602,929 tons.

Most of the Wyoming coal is lignite and non-coking, but suitable for steam and all heating purposes. There is only one known deposit of semi-bituminous coking coal, at Cambria, Weston county, and recently a vein has been opened up in the Ham's Fork Field, Uinta county, that produces a splendid coke under ordinary conditions in a bee-hive oven.

This is not the only fuel available for the mining men in Wyoming, as there are eighteen oil fields of well defined extent in eight of the thirteen counties of the state and the products of these fields vary from the highest grade of illuminating and heating oils, free from the lubricants, to the highest grade of lubricating oil now known, entirely free from illuminating constituents of any sort; these fields are simply in their infancy, only a few wells having been drilled in each field. It is up to the mining man to furnish a market for the fuel oils and promote a great industry that is now practically dormant.

The lubricating oils of Salt creek are refined at Casper and have an international reputation for excellence. From this oil seventeen varieties of lubricants are produced, varying from a light watch oil to heavy cylinder oil and compressor and axle greases.

The best Bessemer ore in the West comes from the Sunrise iron mines, north of Cheyenne, and the total produce of these mines is used at the Pueblo, Colorado, steel works. This ore lies in huge flat deposits, is mined by steam shovel methods and has simply been touched by the

present operations. In several other parts of the state similar bodies of iron are noted and only need transportation to be placed on the market.

The largest natural soda deposits or lakes in the West are scattered over Wyoming and the product is of remarkable purity. It varies from the bi-carbonates to the pure Epsom salts and production has only been kept back by lack of cheap transportation.

This is only an outline of what is found in Wyoming but it will certainly pay the thorough investigator to come to Wyoming and see for himself what the facts are. There is no need to exploit or paint in glowing colors the resources of this state. The story has been told so often that a repetition would be monotonous to the man who is looking for a country free from competition of the older mining camps, free from labor troubles and strifes; this is the place and a number of the best mining men of the country are rapidly finding it out, with the result that there is many times the amount of actual development work now in progress than at any other time in the history of the state with every promise that a few years more will give Wyoming a recognized place in the mineral producers of the West.

## Mineral Resources and Mining in Oregon.

BY FRANK V. DRAKE.

Mr. President and Gentlemen of The American Mining Congress:

In journeying to this assemblage those of you who came from the north crossed the Great River of the West. On May 11, 1792, Capt. Robert Gray entered this river in the good ship "Columbia" and bestowed the name of his vessel on the stream. From the ship's mast head the identical flag fashioned by the cunning hands of Betsey Ross (the first American flag ever made) flouted defiance to its foes and tokened dominion over the western world. This first flag, on this good ship, was the new republic's first messenger around the world. The captain's sea chest wherein was stored the flag when not at the peak, is here in your midst, the property of the Oregon Historical Society.

Some of you on entering the state from the east passed over a range called the Blue mountains. Others coming from the south crossed the Siskiyou mountains, on entering Oregon. In either case you enjoyed unsurpassable scenery and severally encountered the present feet of what in early geological times were twin islands, the genesis of the North Pacific coast.

In the beginning the eastern portion of the Blue mountain range and the Siskiyou mountain were two islands far off the then western coast of what is now North America; mere granite peaks in a world of waters. So that in much of your journeyings here, to our honor and pleasure, you have reached us by traversing an ancient ocean bed somewhat exalted and crumpled now and in part covered with modern lavas, and crossed the feet of two very old islands, the geological parents of this lovely and wonderful state.

At this day, standing on the summit of the ancient Blue mountain island you are surrounded, not by a shoreless sea, but by hundreds of majestic mountains, bald of



head, their faces gashed and wrinkled with canons and gorges and bearded with dense, dark firs, cedars and pines, the unshorn growth of the centuries. These are the giants which hoard the treasure vaults of Eastern Oregon. They, with intervening valleys, cover a territory nearly equaling in extent the combined areas of the states of Massachusetts, Rhode Island and Connecticut.

Standing upon the summit of that other ancient island, the Siskiyou (designated in United States Government surveys as "Klamath") you are surrounded by another array of sentinels, wrinkled and whiskered like their brothers, guarding immeasurable treasures in Southern Oregon and covering an area of over 15,000 square miles.

Coming northward through Central Western Oregon, a section often locally embraced in the general designation "Southern Oregon," you cross the more modern ranges of the Rogue and Calipooia, and here again the massive hills, all bearded and unshorn, are hoarding limitless treasures for the good of the industrious and hopeful men who dare attempt great deeds for great wealth. The area of the richly mineralized portion of this section equals in extent at least one of the populous and wealthy New England states.

In 1845 at the feet of that old Blue Mountain island, the second discovery of gold in the present limits of the United States was made. Marshall, who made the discovery in California in 1848, was an Oregon emigrant. It was this third discovery that set the world ablaze with universal desire to get riches quickly. That desire has not perceptibly abated with the passing years. Gold was found on the Santiam river in 1847, but the immigrating Missourians of that day had not developed fully the characteristic desire to "know things by seeing them" and didn't yet know gold when they saw it. The stories of their conjectures as to what the yellow stuff really was are both pathetic and ludicrous. It was useful, however, and nuggets were easily hammered into sinkers suitable for their fish-hooks. Later, millions of ounces of the royal metal mined from the placers in Oregon went into history as California gold.

*Gold Coinage in Oregon in 1849.*

The provisional government, which had been organized pending the determination of the controversy between the United States and England for dominion over the Oregon territory, through an act passed and approved by the then governor early in 1849, established a mint at Oregon City. Coinage of \$5 and \$10 gold pieces was authorized. The mint, with dies shaped from old wagon tires, was constructed by American mechanics and the first coins minted on this coast were of pure gold. The image of a beaver appeared on each coin, whence the name "Beaver Money."

Oregon, with proper modesty, of course, desires facts admitted of historical record that the first discovery of gold in the Atlantic southeastern states, made in the early history of the nation, was seconded by a like discovery in this Pacific Northwest and preceded the find in California in 1848; further, that Oregon made the first Pacific coast gold coins, contributed mightily to the golden glory of California and now proposes to become and continue an active rival of her admirable sisters in the production of the precious metals and other commercial minerals.

Oregon's modesty has been detrimental to her, historically and industrially, especially in the department of mines and minerals. Her legislators, even, have not met the needs of the times in recognition of the industry; but better things are stored in the near future.

*Obstruction to Development.*

Furthermore, various coincident conditions retarded development in this line. The first discoverers did not know gold. They were trappers, farmers and missionaries; They were far removed from governmental protection and the British claimed the territory. Congress, uninformed, was obstructive, almost antagonistic, to the purposes of the far away pioneers. Unlike the passive, even helpful Digger Indians of California, the Oregon Indians were murderously aggressive and many of them had to be killed. The mountains were prodigious, covered deeply with soil and timber and prospecting for minerals was laborious and

slow. The unexcelled forests, prairies, fish-stocked rivers and multitudinous herds and flocks of fat game attracted the man who did not come looking for mines. Development of the state's mineral resources was therefore slow and the early miners took only a small part of the most accessible and easily gotten coarse gold of the placers. Sluicing and rocking was the limit of the early days.

*An Oregon Contemporary of the Father of Geology.*

Volumes must be written after many years of exploration and study, before the geological story can be fairly well known. The science is young and has not progressed very far. We have, living within view of our city's heights, a yet young woman, mentally and physically vigorous, who, during her lifetime, was a contemporary of William Smith ("Strata" Smith), the acknowledged father of geology. This lady of only 117 summers, is older than the new-born science which we call geology.

This youthful and vigorous science, while helpful to the miner, is from the very nature of things, of slow determinate growth. Problems of the rocks present many conjectural propositions. Miners cannot wait for absolute conclusions, but with the aid of accumulating knowledge can press on to meet the demands of an intensely utilitarian age. So that the "nebular hypothesis" as compared with the later "aggregation" theory, or any other theory of the earth's beginning, is relatively unimportant to this Congress of men representing those who are engaged in exploiting the active present.

It is not at all certain that the rocks of those various, somewhat arbitrary, ages are the same in point of time in different parts of the world; that the cambrian, for instance, of the old world was contemporaneous with the cambrian of the new world; nor that the trilobites of Europe existed contemporaneously with those of Colorado; nor that the coal measures in the long permanently frozen arctics were created in the same (carboniferous) age as those of the tropics. There may have been several millions of years between the uplift of like rock structures in dif-



ferent sections of the crust. Like conditions may have existed at different localities at long different intervals of time. Occasionally the rocks of one "epoch" are wholly absent from the place scientifically allotted to them—as the Devonian, in Colorado.

In the wonderful fossil beds of the John Day country, Eastern Oregon, at the present base of the original Blue Mountain island, are remains of mammals, long extinct; the horse, three-toed at first, is there found in progressive stages of development; also the camel, elephant, broad faced ox, mastodon and mammoth, with remains of a tropical vegetation. Remains of like tropical animals and tropical vegetation are abundant in the "Stirling Creek" placers at the foot of that other ancient island, the Siskiyou (Klamath). Yearly for fifteen years last past the hydraulic giants have unearthed large fossils of former tropical fauna and flora on Stirling creek.

#### *Mineral Resources of Oregon.*

For reasons heretofore alluded to the mineral resources of the state are but slightly developed. They are mostly "prospects." The state is large, the inhabitants few, the mining sections big in size and in promise, but widely dispersed. All that can be done here in the way of description is to "concentrate" the material to the utmost—get it down to cupellation if possible. I can safely say, at the start, that much valuable stuff will go, necessarily, for the present, into the waste dump. Of course, critics are sure to overhaul the dump; you know how it is, yourselves.

Most of the known minerals, including those peculiar to meteorites, are found in Oregon. A magnificent meteorite, recently discovered near this city, is convenient for your inspection. We think it surpasses the specimen which helped to make Montana famous. It is twenty feet in length, seven feet four inches wide, five feet seven inches in thickness and is estimated to be twenty tons in weight.

The geological conditions of the three divisions, Eastern, Southern and Central Western Oregon, favor strongly

the presence of gold and other of the valuable metals and minerals; there are granites, limestones, diorites, andesites, argillites, calcites, greenstones, quartz, quartzites and porphyries—briefly, the old formations and the slates, schists, eruptives, faults and fissuring common to such countries. The flow of lavas, chiefly of basalt, has been enormous, covering large areas. Portland metallurgists have overcome incredulity and proven that sections of basalt in the Cascade mountains carry gold to the amounts of from \$2 to \$20 per ton, some samples going to \$70 per ton.

Each of the specified general divisions of the state embraces great numbers of local mining “districts,” with boundaries ill-defined and having, as elsewhere, characteristics distinct from others. A description of one would not suffice for any other, would be tedious, taken as invidious, and is unnecessary here.

*Gold is Oregon's Chief Mineral Product.*

The chief metallic product of the state is gold. The past output and present production of Oregon gold has been variously estimated. There are no means of determining either. The state has never attempted inquiry. It is known from a few brief and scattered records, from statements of old residents of localities, and the area and character of mining workings of the past, that the aggregate must be enormous. The records of one bank, still doing business in Jacksonville, show early shipments through the institution of \$28,000,000 in gold dust, and this bank did but a part of the business of that locality.

The placer workings have been extensive in both Eastern and Southern Oregon. Obstructions before mentioned, together with absence of means for transporting supplies and machinery for hoisting ores and constructing mills have delayed search for the opening of the gold mines.

At various points on the ocean beaches gold has been profitably mined. In some localities the returns enriched the workers substantially. A great variety of machines and amalgamating and metallurgical devices have been

tried, but saving of a high percentage of the values has not been attained.

Dredging machines, some of great power and capacity, have recently been installed in different localities where water is scarce and dump facilities wanting. Hydraulic elevators are used when available and the bed rock "pitches" the wrong way. Smelters for wet and refractory ores are being erected. Cyanide is used at several plants successfully, and marked improvements in mining and treating the lower grade ores are being made. Oregon's numerous and rapid water streams and waterfalls, having in one instance 800 feet sheer descent, are becoming important factors through the creation of electric power.

It would be useless to attempt a list of mining claims in the state; there are over a thousand lode records in one district, and there are over one hundred recognized mining districts in the state. These claims are in various conditions, as is usual in all mining localities. Some are abandoned, some mere prospects, some in process of development, and some splendid, profitable mines with big machinery and milling plants.

Some of the placers have been and are exceedingly profitable, and some have very complete and powerful equipments, such as batteries of large giants, hydraulic elevators, dredges, etc. Years of hard work would be consumed in a thorough examination of them all.

Omitting mention of numerous minerals, which may become of value in the future as population, transportation and working facilities increase, a brief statement of deposits available at the present day will be attempted.

DIAMONDS, garnets, sapphires, opals, agates and many rare minerals exist in various localities in this state. I found opals on the surface near Hay creek in Eastern Oregon, and have seen numerous specimens of the above mentioned minerals. None were of grade or quantity to be of commercial value. Further search may get better reward.

JOSEPHENITE, a mineral discovered in Josephine county, is an alloy of nickel and iron. The specimens found



appear as smooth pebbles, black in color. Polished, it appears like metallic iron or nickel.

ANTIMONY occurs associated with the base gold ores found in localities in Eastern Oregon, and in Southern Oregon.

ARSENIC appears locally in combination with various ores, not yet in commercial quantities.

ASBESTOS is reported from numerous localities in the state. Some deposits promise to become valuable and are being developed. Best specimens so far show about a second grade in quality.

BORAX exists in extensive areas (marshes) in Harney county. At present a limited product from this locality is hauled 150 miles by mule teams to rail at Winnemucca, Nevada—about 400 tons yearly.

CEMENT material is found and is being exploited and tested in several counties. Claim is made that some of these products, by fair tests, surpass Portland cement. Success in this line of manufacture seems certain.

CLAYS of excellent qualities and in ample quantities exist in many localities. Kaolin of fine grade and abundant is obtained at many points, also fire clays; and bricks, tiles and pottery are being manufactured at different points by some seventy different firms and individuals.

COAL has been mined in Oregon since 1855. The Coos Bay fields cover 150 square miles in Coos county and additional discoveries in that locality are recently reported. For a long period the average yearly production was 50,000 tons. The output has lately been increased. The markets are San Francisco and Portland. Several mines are being worked in this field. Extensive coal fields exist at Yaquina, Lincoln county, partly developed. The mineral is found in Tillamook, Curry, Columbia, Clackamas, Marion, Lane, Yamhill, Douglas, Jackson, Morrow, Wasco, Grant and Baker counties. The principal deposit in Eastern Oregon, so far appearing is about twenty miles from (above) the town of Heppner. Traces of coal are found in many localities.

COBALT, apparently in commercial quantities, associated with gold, copper and nickel occurs in the Standard Con. mine, Grant county.

COPPER, associated with gold and silver, appears in many parts of the state. The Southern Oregon sections present the best showings in this metal and are being considerably exploited. I repeat former predictions in saying that the locality will soon be generous in copper products. No mines of this metal are yet supplied with reduction works. A smelter recently erected in Josephine county will be blown in about September 1st next.

GYPSUM is being profitably developed near Huntington, Baker county. Plaster of paris is being manufactured from this deposit which consists of two beds, the lower one twenty feet thick, the upper one forty feet thick. This mineral is found also in Douglas, Jackson and Klamath counties. There are enormous beds of chalk in Klamath.

IRON ores occur in Clackamas, Columbia, Tillamook, Lane and Jackson counties. The only deposit mined in quantity was at Oswego, Clackamas county, but this mine has been closed for several years. The products of several deposits are utilized for paints. Columbia and Jackson counties have extensive deposits of iron of commercial grade.

LEAD is not mined here, save perhaps as a by-product. It is present in many of the base ore properties of the state.

LIME is manufactured near Huntington. Other kilns are in Wallowa, Jackson and Josephine counties. The product is sold in the local markets.

MERCURY is being produced at Blackbutte mine, Lane county. A great deal of development has been made here. The property is equipped with a "California" furnace. The value of the product is not available. There are numerous prospects of cinnabar in various localities, some of which are being exploited.

MOLYBDENITE is found in a few places in Eastern Oregon and in Jackson county. "Pockets" of grains of

nearly pure metal are reported from a vein carrying other minerals in Union county.

NICKEL, associated with other minerals, occurs in both Eastern and Southern Oregon. The principal deposit lies in Douglas county, but has not been profitably worked.

PLATINUM, with gold in placers, is mined in Baker, Union, Wheeler, Coos, Curry, Jackson and Josephine counties, and in many of the beach claims along the sea coast—in the beach sand. It is saved only as a by-product. This metal became so abundant in localities in Southern Oregon as to interfere with saving gold in the placers, and the miners were much annoyed—until the market price became known to them.

NITRE, in apparently considerable quantities, is reported to exist in Lane county and some claims have been laid on the deposit.

SILVER is not mined specially, but associated with gold and copper; it is a by-product in Oregon.

STONE in endless variety and great quantities awaits roads and a market. Vast beds of sandstones of practically every kind and color are widely distributed. Enormous deposits (mountains) of marble, of best qualities and great variety, await the coming of good roads. Building stones, from peculiar tuffs, easily shaped and dressed, to slates, basalts and granites, are more abundant. Granite of good quality is plentiful. A specially excellent grade of this stone is found in a mountain of the material in Lincoln county, also in Marion and Jackson counties.

SILICIA, in the form of sands, of quality adapted to the manufacture of glass, is plentiful at many points.

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## The Mineral Resources of South Carolina.

BY EARL SLOAN, STATE GEOLOGIST.

### *General Geological Conditions.*

An inspection of the physiography of South Carolina reveals two series of formations, widely differing in their topographical, structural and floral features, and separated by a meandering line, designated the "fall line," which crosses the greater streams at the head of navigation. This line, beginning at North Augusta, proceeds by Columbia and thence by Camden to the North Carolina state line, northeast to Cheraw. The area north of this line, designated the Crystalline Region, comprises the older crystalline rocks and is characterized along its upper limits by a somewhat serrated mountainous profile graduating southerly into intricately ribbed and undulating ridges with deeply sculptured valleys and rapidly flowing streams. South of the fall line we find the younger sedimentary beds, which overlap the crystalline rocks and extend thence to the sea, constituting a vast peneplain, known as the Coastal Plain, which along its upper limit characteristically affords extensive plateaus incised with deep valleys in almost abrupt juxtaposition, the included rivers having slow velocities and navigable channels.

Proceeding from the northwest part of the state along a line normal to the coast we observe distinctive zones of elevation extending approximately parallel with the coast. First the Montaine Region, with its serrated topography culminating in peaks as high as 3,500 feet above the sea level, which rapidly and irregularly declines within thirty miles to the Piedmontaine Region where the ridges afford elevations from 700 to 900 feet, and the beds of the larger streams are from 500 to 700 feet above the sea level. This "Piedmont Region" gently graduates through the middle country to the fall line, where the crystalline rocks pass under the Coastal plain formations at elevations above sea level, varying from 119 feet in the deeper valleys to 680

feet on the plateau between the Savannah and the Congaree rivers, and 597 feet between the Wateree and the Great Pee Dee rivers. Borings south of the fall line show the inclination of the surface of the crystalline rocks greatly increased, attaining in the Savannah area fifty-four feet to the mile and in the Pee Dee area fifty feet to the mile, but apparently less along the line between the two. The overlapping Coastal Plain formations, as exposed along the upper limits of their plateaus, as above indicated, attain a maximum elevation of 680 feet from which, through the intervening sand hill region, they decline within twenty miles to an elevation of 400 feet, and thence gently graduate through eighty miles of low country, to the sea level at the coast.

An examination of the structural and general geological features shows the crystalline region to be constituted of rock formations more or less hard and crystalline, often pitched at high angles, folded, faulted and otherwise dislocated and deficient in fossil remains. Proceeding from the mountains to the fall line, or along the older to the younger rocks, we successively observe gneisses, schists, slates, limestones, dolomites, quartzites, granulites, gneisses, slates (intruded basalts), granite and shales. These rocks afford valuable structural and monumental stones, and include veins of gold, tin, lead, copper, iron, manganese, graphite, corundum, mica, barite, limestone, talc, asbestos, feldspar, kaolin, monazite and the precious stones and other minerals.

Passing next to the Coastal Plain, we see some loosely aggregated materials without distinct stratification, and some stratified materials with a gentle dip, the latter more or less rich in fossil remains, the former rarely affording biotic evidences. We thus observe beds of subangular and rounded quartz, pebbles, gravels, arkose, sands, kaolin and other clays, sandstones, shales, buhrstone, marls, shales, phosphate rock and coastal beds of loose shells and sand; from some of which are derived structural sandstone, kaolin, "glass sand," potter's clay, brick clay, fuller's earth, marls and phosphates.

The subdivision of these two series in South Carolina into their component systems, groups and stages is much more feasible in the case of the younger fossiliferous strata of the Coastal Plain, than in the case of the crystalline region, where in the entire absence of biotic evidence our discriminations must largely depend upon correlation, or inferences based on the order and manner of superposition of their lithological equivalents in strata elsewhere more favorably situated for differentiation.

### *Metals—Gold.*

South Carolina was one of the pioneers in the discovery and development of gold deposits. She for many years past has enjoyed the distinction of producing more gold than any state east of the Mississippi river, notwithstanding the fact that the extensive discoveries of gold in California caused many miners to abandon properties here for the more alluring western fields. Then again under the old methods of recovery only the free milling or easily roasted ore was available, and consequently good properties were abandoned when the depth of the sulphides was attained.

Modern chlorination and cyanide processes are reclaiming some of these properties, with excellent returns, and there are other properties with good reserve values awaiting similar treatment.

It will be observed that the prolific producers to-day were well known but indifferently regarded during the "fifties." The sulphurets staggered development.

There are three designated gold belts in South Carolina, although the continuity of the geological connection is much broken and the geognostic features varied in each. One beginning in the upper portion of Spartanburg extends through Greenville, Pickens and Oconee counties.

Formerly considerable placer running, and limited vein running was conducted along this belt. The operations are now confined to intermittent placer work, principally at the McBee mine (old Carson mine), nine miles north of Chick Springs.



This property would probably respond well under systematic and organized treatment, but systematic exploitation should be undertaken to more fully demonstrate its susceptibilities.

The parent vein consists of a zone of mica schist, impregnated with numerous auriferous stringers of quartz, which gradually breaks down to form the placer deposits.

The following additional localities in this belt have afforded gold:

Greenville county, Wildcat creek, Enoree river, at a point ten miles east of Greenville; Oconee county; Jesse Lay mine; Cochran mine; Sloan mine.

The second belt beginning in upper York extends southwesterly through Cherokee, Union, Lower Greenville, upper Laurens and Abbeville counties.

These veins consist principally of lenticular masses of auriferous quartz and pyrites interstratified with the talcose or micaceous slates which are pitched at high angles. Some of these ore bodies are of considerable extent in length, depth and width. The Ferguson mine, situated in York county at the head of King's creek, about seven miles southeast of Grover (on the Southern Railway) is of considerable promise. It has recently been equipped with a twenty-ton cyanide plant.

The vein is of pyritiferous quartz enclosed in heavily bedded talcose shales (dipping southeast about seventy degrees with the horizontal and striking N. E.). At a depth of 100 feet the vein which is seven feet wide averages from \$12 to \$15 in values. It concentrates about fifteen to one. The outcrop has been traced for a considerable distance, extending to adjoining properties. A series of mines in the King's creek district have been worked during quite recent years and while assays and mill tests indicated excellent values inexperience in attempted chlorination resulted disastrously, which with prohibitory transportation expenses to other reduction plans combined to cause temporary suspension. The prominent mines thus worked were the Allison, Wolfe Cr., Hardin, McGill, Bratton, Brown, Magnolia and Flint Hill. There are numerous

other mines and prospects along this belt, terminating with the Old Dorn mine, which have been idle for various periods and reasons—but many of which will doubtless respond to modern treatment.

The West Springs group: This group comprising the Mott Thompson and West mines is situated in the upper portion of Union county about seven miles south of Glenn Springs railroad station. The veins comprise large ledges of quartz charged with auriferous pyrites. They have been intermittently worked for many years with varying success.

Parsons mountain in Abbeville county has been the scene of desultory gold mining for several years. It is claimed that some good prospects await development in this neighborhood.

The Bradly prospect on the P. R. & W. C. R. R. has afforded fine indications worthy of fuller exploitation. The Dorn mine at McCormick has been one of the most extensive gold producers in the South.

The third belt originates in Chesterfield county and extends southwesterly through Lancaster, upper Kershaw, Fairfield and Newberry counties, its southerly portion being in many places obscured by the overlapping cretaceous sands—whereas there are some few of the lenticular type of quartzose veins in this zone, the characteristic deposits are extensive masses of slates impregnated with auriferous pyrites and quartz stockwerke. The workable parts of these impregnations are in places 200 feet wide, and have been worked to a depth of about 300 feet.

The ores rarely exceed the average value of \$5 per ton on the basis of the mill run, and are usually represented at \$4.50. They concentrate about ten to one.

The Brewer mine, situated near Jefferson station in the western portion of Chesterfield county, has been extensively worked in the past, but closed during a term of years through conflicting interests and litigation. This mine has resumed operations during the past year and is now equipped with a large cyanide plant. This deposit is an enormous ore body and will add materially to the state's output.

The Haile mine is situated in Lancaster county, about three miles east of Kershaw station. It has long enjoyed a prosperous career and the distinction of producing alone more gold than any entire state east of the Mississippi river. The Thies chlorination process was brought to its present perfection at this plant, where it has long been operated under its able inventor. Industrially, scientifically, and by reason of its vast extent this is the most interesting gold mine in the East. Its ore output has often exceeded 35,000 tons annually. There are lesser mines in this belt which have been worked with variable success and some of which promise under improved methods to again respond generously.

*Tin.*

Tin ore was observed by the writer sparsely distributed in the King's mountain district during the year 1892 and specimens were exhibited at the Charleston Exposition. During the year 1903 a prominent deposit of tin ore, or cassiterite, was discovered by Capt. S. S. Ross, a gentleman of considerable mining experience and skill, on his place in Cherokee county, one and a quarter miles northeast of the Gaffney railway station (Southern Railway). During the early part of the year 1904 Captain Ross began the exploitation of this property for which purpose there was installed under skilled supervision the necessary concentrating troughs and three Joplin jigs. With this equipment there has been tested the surface or placer material over a limited area, and the ore extracted from an incline extending nearly 100 feet along the dip of the ore body (thirty degrees increasing with depth). A shaft now being sunk through the hanging wall formation to intercept the ore body at a considerable depth is down seventy-seven feet at which level a crosscut to the vein is being driven.

It will be observed that considerable dead work has been instituted. With a small force these prospecting operations have since January afforded about 80,000 pounds of cassiterite analyzing 70.45 per cent of metallic tin of a very fine grade, and which has been marketed in England



at the best market prices, with an eager demand for more of such high grade ore. Character of the deposit: The area of the surface or placer deposit, resting on the upturned edges of shales and schists, has not been delimited by systematically located test pits, in the absence of which real calculations are merely conjectural and quantities mere surmises; however, surface pannings indicate the probability of an extensive placer area. The surface matter may be regarded as of three layers: First, resting on the shales occurs a layer of about nine inches of loose quartz fragments, and decomposed feldspathic matter carrying about three per cent. of cassiterite. Overlying this is about three feet of red clay carrying about one-half of one per cent. of cassiterite. Superimposed on this is similar clay of variable thickness, ordinarily from one to three feet, in which a trace of tin occurs.

The lower three and three-quarters feet afford in values about \$3 to the cubic yard.

All of this material is delivered on a screen which separates the coarse lumps of quartz, etc., the fine material passing thence to the sluice boxes where the current of water concentrates the particles of cassiterite by sweeping away the greater portion of the lighter material. This partly concentrated cassiterite is removed to the Joplin jig for final concentration in which condition it represents about seventy-one per cent. of metallic tin.

*The Parent Vein.*—We observe here no ledge or dyke of gigantic granite, pegmatite or greisen, with sharply defined walls, enclosing the tin ore. The cassiterite occurs where exposed along the slope in particles, sometimes crystalline, varying in size from the minute to ten-pound lumps. It occurs in a feldsparthic matrix, graduating to micaceous, and the individual particles are in some instances covered with talcose matter, with an obscure fibrous grain, twisting conformably to the shape of the enclosed lump of cassiterite. This impregnated feldspathic zone (striking north forty-eight east and dipping south forty-two east, about thirty degrees with the horizontal), varies in thickness from two to nine feet. Where nine feet

thick we observe about two feet of matter which affords thirty to forty per cent., by weight, of concentrates (cassiterite), the remaining seven feet affording from ten to twenty per cent. of concentrates. It presents an exceptionally fine prospect.

The material representing the hanging wall is greatly weathered, but is apparently a hornblende schist—succeeded by hornblende shale and mica schist. The foot wall material is mica schist. A knowledge of the rock associated with the Ross tin deposit might prove of value in tracing the extension of the tin bearing formation. Beginning 750 feet northwest of the outcrop of the parent tin vein and proceeding normal to the strike, we first observe very hard syenitic shale, on edge, resting against a prominent stratum of highly indurated quartzitic matter porphyritic enclosures of feldspar; the strike is north forty-eight east, and the dip south forty-two east. Approaching the tin vein we must successively pass feldspathic shales, hard hornblende shales, arenaceous mica schists, black quartz enclosing pink feldspar, pegmatite, mica schists with chloritic seams, and then the mica schist constituting the foot wall of the vein. Proceeding beyond the vein to the southeast we observe decomposed hornblende schist and hard hornblende shale beyond which the formation is obscured until we attain the distance of 328 feet, where there are evidences of a diorite dike. The writer traced the formation to the northeast, crossing the Broad river at the McCraw place, about one mile below the old Ross ferry. Southwesterly it was traced through the northern part of the town of Gaffney and thence towards Thickety creek, beyond which the zone probably extends toward Cedar Springs, in Spartanburg county. The South Carolina geological survey is now engaged in tracing this formation to the limits of its exposure in this state with a view to assisting in the discovery of additional deposits. A brief review of the associate geognostic features of this tin deposit may prove of interest. The average strike of the strata of the King's mountain region is northeast. Beginning near Broad river at the line in prolongation of

King's mountain and proceeding northwesterly, or across the upturned edges of the strata, to the neighborhood of Thickety mountain we observe, in this section of twelve miles, the following successive formations of industrial value:

One—The talcose slates enclosing extensive gold deposits.

Two—The itacolumitic rocks interstratified with the beds of specular iron.

Three—The talcose slates enclosing the beds of superior magnetic iron.

Four—The limestone strata.

Five—Beds of best defined itacolumite.

These five constitute the itacolumite series, mica, hornblende and feldspathic schists and shales constitute the following members:

Six—The hornblende and feldspathic shales containing the tin.

Seven—Micaceous schists enclosing brown hematite.

Eight—Micaceous schists and feldspathic shales enclosing monazite.

Nine—Gneissoid rock along the axis of the anticline (beyond which the strata dip to the northwest.)

Ten—Micaceous schists and feldspathic shales affording monazite.

Eleven—Mica schists enclosing brown hematite ores in resumption of "seven."

Twelve—Undetermined. But if the tin ore was deposited contemporaneously with the enclosing feldspathic shales represented in six, it is reasonable to expect a repetition along the upper side of the anticline at no great distance from the Thickety mountain.

#### *Iron.*

Numerous deposits of iron are in this state, occurring in formations ranging from the tertiary to the silurian, but up to the present time none have been noted of modern industrial importance excepting in the King's Mountain district. One zone, beginning north of King's mountain, extends southwesterly through Cherokee and parts of Spart-



anburg and Union counties, and comprises magnetic and specular ores bedded in talcose schists or shales and in the itacolumitic rocks. These beds were worked to great advantage when charcoal was available, prior to 1865. The magnetic ore, or catawberite, afforded a peculiarly superior iron, close grained and soft, yet tough, which was extensively employed in the manufacture of the Confederate ordnance. Furnaces and rolling mills were operated for this purpose adjacent to the Cherokee ford on the Broad river. Specular ore was also employed in mixtures and alone for the production of superior pig metal for castings. The red ore or itawberite is a low grade arenaceous magnetite, which also affords good pig metal for castings.

The catawberite, or magnetic ore in talcose schist, appears intermittently for nine miles, crossing the Broad river near Cherokee ford, five miles east of Gaffney, and a half mile north of a spur track of the Southern Railway. It consists of lenticular bodies of magnetite crowded in talcose schist, pitched at high angles, attaining in places the width of forty feet, and extending to depths as yet undetermined. The sorted ore in large lots exceeds fifty per cent. of metallic iron, and is free from objectionable association excepting in the matter of the magnesian gangue which adds somewhat to the difficulties of fluxing. The exposures of this ore adjacent to the Broad river are the most prominent and most favorably situated for development.

The specular ore occurs along a zone parallel to, and east of, the catawberite belt—the two being about one mile apart. These deposits occur interstratified with the itacolumitic shales and are much more continuous than the catawberite, which alternately pinches and expands. The specular ore deposits below the valley line become pyritiferous. This ore has been freely used with excellent results as already noted. The time will not be distant when the superiority of these ores for the manufacture of steel and the finer grades of iron will render their use imperative, for the supplies of the high grade ores more favorably situated in this country are not unlimited.

The Itawberite occurs along the southwesterly exten-

sion of the line of the specular ores; the deposits are not very extensive and are chiefly of interest in their advantageous susceptibility of being mixed with the superior ores by reason of their easy fluxing properties.

Two miles north of Gaffney we observe beds of brown hematite ores occurring in mica schists as a result of the alteration of pyrites. The available ore which was therefore quite shallow was freely drawn upon by the old Cowpens and Pacolet furnaces. The mica schists strike northeast and dip southeast. These beds find their counterpart about eight miles north, where schists with similar strike dip to the northwest indicating a former anticline whose crest has been degraded, thereby exposing the upturned edges of the strata, consisting of micaceous hornblende and feldspathic schists and shales, monazite occurring in the latter intermediate to the two zones carrying the brown hematite ores.

It may be competent to mention that limestone, suitable for fluxing, and sandstone, suitable for furnace linings, are found in close proximity to the iron ores, and that a vast undeveloped water power occurs on the Broad river one mile south of the iron zone.

#### *Copper.*

A great many of the veins of the crystalline region are impregnated with iron pyrites which in many cases is mixed with copper pyrites the proportion of the latter often increasing with the depth of the vein. It is thus observed in many of the upper counties, but the only deposit which has been systematically exploited for copper is the Mary Mine which is situated about four and a quarter miles northeast of York.

Professor Lieber inspected the Mary Mine during its exploitation in 1857 and reported that the work comprised two shafts respectively fifty-five and thirty-nine feet, one cross-cut of thirty-five feet, and a gallery on the vein for 160 feet. He recites that the vein is composed of quartz impregnated with copper pyrites varying in width from three to five feet. He pronounces it a contact vein between

a porphyry dike and the mica slate the porphyry being a contact dike of the granite. He recites that it would be difficult to discover finer prospects for a copper mine.

*Nickel.*

In Newberry county about ten miles westerly from Newberry, C. H. appears the Culbreath mine, regarding which information has been received, from which the following is deducted: The vein matter consists of a very hard siliceous slaty rock, impregnated with iron pyrites, gold and nickle, in contact with an intensive igneous rock, the country rock being slate varying to feldsite. It is claimed that from seven to twelve feet will concentrate 10 to 1; the concentrates assaying

Copper .....	4 per cent.
Nickel .....	2 per cent.
Gold .....	\$7.50

Considerable work in the line of exploitation has been done; one shaft is down more than seventy feet. The owners, Dr. McIntosh and Mr. Culbreath, whose address is Newberry, S. C., have displayed great confidence and enthusiasm in the the development of this property.

*Monazite.*

*Non-Metallic.*—The zone in South Carolina along which monazite is as yet recognized as occurring in economic quantities begins in Cherokee county at the North Carolina line, west of Buffalo creek, and extends north of Gaffney, north of Cowpens, south of Spartanburg, and thence proceeds south of Greenville in a southwesterly direction. It also occurs to an extent in York county and sparsely in other localities not remote from the indicated zone.

It occurs sparsely impregnating 'feldspathic shales in the form of small crystals and grains, which are hard and much heavier than most of the associated matter. In places it is sufficiently abundant in these shales to admit of their being mined and concentrated, when the shales have been softened by weathering influences.' Such favorable oc-



currences, however, are rarely found. Under the protracted processes of degradation and erosion these shales are disintegrated by nature, the softer and lighter material being removed in suspension in water, and the harder and heavier material accumulating in the valleys and along the beds of streams. It is from these sand beds of branches that most of the monazite of commerce is obtained. A deposit which will afford a pound of monazite from a barrow load of sand is considered a "good proposition." The sand is separated from the monazite in a modification of the "long tom" employed in the placer mining of gold. Thus concentrated the monazite is accompanied in varying degrees with garnet, magnetic iron ilmenite, and grains of other heavy minerals occurring in the associate rocks. The monazite thus concentrated varies from sixty-five to ninety-five per cent. of the concentrated material. It is thus sold at the magnetic separators on the basis of eight cents the pound for pure monazite. This monazite contains from 5.25 per cent. to 7.25 per cent. of thorium.

There is but one separating plant in this state; there are several in North Carolina; and consequently there is less convenience and accessibility in South Carolina, and therefore less development of this industry.

The more prominent deposits in South Carolina are along branches tributary to Cherokee Creek, approaching on the north within three miles of Gaffney. Along the Cherokee, the Lemmons (L. C.), Magnus (J. J.), Swafford (J. M.), Jones (J. B.), and Sarratt properties occur, and have been operated for several years. Along Little John's Branch (a tributary of Thickety Creek) in Cherokee county we observe the Husky (J.), Blanton (J. C.), and Petty (Chas.) properties which have been worked; there are probably others. Near Cowpens station, but on the east side of Thickety Creek the Oglesby and Potter properties afford good prospects as also do the Caldwell and Martin places on the west side of this creek. West of Cowpens in Spartanburg county and tributary to the Pacolet river, the Petty, Dewberry, Martin, Bryant, Wilkins and Simons properties are regarded as good. North of Converse on the Pacolet

river the Black and Martin properties are considered good prospects.

About four miles west of Spartanburg there is an area considered of good promise.

Passing to Greenville county, fair prospects have been observed near Taylor station, and four miles south of Greenville the Wright (A. B.), properties are said to be good prospects.

The monazite of this zone carries from 5.25 to 7.25 per cent. of thoria, the constituent in demand for the manufacture of the Wellsbach and similar incandescent mantles.

*Barytes—Baryta.*

About 500 feet southeast of Kings Creek station, on the C. C. C. R. R., in Cherokee county a deposit of Barytes of considerable prominence occurs. There are three major veins and several lesser stringers interstratified with talcose slates and arenaceous shales, the widest vein showing about ten feet in thickness. Strike N. 20 E., Dip 57 E.—22.5 degrees with the horizontal—outcrop intermittent for about 2,000 feet.

Some parts of the ore are very fine, others carry some quartz and occasional specks of pyrites and galena. Weathering of the pyrites causes local areas of stain.

Kings Creek, coursing through the property immediately adjacent to the deposits, affords an abundant supply of water, which, however, is not clear.

This ore should be ground and concentrated on the spot.

Very limited exploitation has been done on this property.

There are some slight indications of baryta said to have been observed east of Blacksburg.

*Kaolins, Clays, Fullers' Earth.*

The very exceptional extent and importance of the varied forms of South Carolina clays, which are capable of greater development and extension than any other mineral industry, should commend them to special consideration.

Kaolins and other high grade clays occur, associated

with both the crystalline and coastal plain formations. In the former they appear without reference to any particular period, being a product of decomposition, in situ, of the generally distributed feldspathic rocks, but in the coastal plain region the kaolins representing transported sediments, of previously decomposed matter, deposited at certain definite periods, are assignable to specific horizons. Thus the best of sedimentary kaolins which are most extensively developed in South Carolina are assigned to the Cretaceous period and again our best fullers earths extensively prevail in the tertiary.

The following table indicates the horizons to which the different varieties of clay and other products of the coastal plain pertain in South Carolina:

Recent.—Thin beds of sand and clays in sections subject to recent inundation. Economic products: Structural sands and some brick clays.

Post Pliocene.—Beds of sand, loams, clays and shells. Economic products: Brick clays.

Neocene.—Eolean sands, Lafayette clays, loams, sands, cement gravel and cobbles. Prominently developed across the upper part of the coastal plain. Economic products: Sand supply for locomotives, molding sand: cobblestones and cement gravel for road construction and railway ballast.

Pliocene, Miocene and Oligocene (?) marls, clays and sands. Economic products: Fuller's earth, brick clays, sewer pipe and tile clay; phosphate rock; marls adapted to the manufacture of cement and lime; marl and greensand for agricultural purposes.

Eocene.—Dark laminated clays, sands, ferruginous sandstone, Eocene grit, buhr-rock; fine grained yellow Sienna and purple sands and loams; shells, greensand, marl, siliceous clay enclosing layer buhr-rock, coarse fossiliferous sands, sandy loams, lignitic clay. Occupy approximately the median two-fourths of the coastal plain; irregularly parallel to the fall line. Economic products: Fuller's earth; potter's clay; structural and mill stones; lime marl; greensand and marl for agricultural purposes.



Cretaceous.—Buff-colored high grade marl; greensand marl; clay marl; black clay. Economic products: Lime marls; agricultural marls; clay marls suited to the manufacture of vitrified brick.

Middendorf—white sands (25 ft.), bed of dense white and drab kaolin with waxy luster (fossiliferous); harsh sands; vari-colored cross bedded fine grained sands; thin seams of colored clay interlaminated with sands; gravel. Economic products: China clays; paper stock clays; "glass sand."

Hamburg—From nil to eighteen feet of fine white kaolin, white sands in micaceous koalinitic matrix; vari-colored banded sands; purple and white kaolin; arkose; sub-angular boulders and fragments of quartz, slate and gneiss in arkose matrix. Economic products: China clays, paper stock clays, potter's clay, "glass sand."

The Cretaceous occupies the upper fourth of the coastal plain of the Aiken, Edisto and Santee areas and both the upper and lower fourths of the Pee Dee area.

Crystalline—Shales, schists, granulytes and gneiss with their upper portions kaolinized. Economic products: Residual clays; meta-residual clays; inferior cornish stone and feldspar; superior structure stones, etc.

#### *Residual Kaolins.*

No residual deposits of kaolin have been commercially developed in South Carolina, and whereas there are many indications of such veins scattered throughout the granitic or crystalline region the occurrences of most conspicuous promise yet noted are along a zone, in close proximity to the trappean rocks, extending from Mount Carmel to King's Mountain; the dynamic influences of these igneous rocks probably predisposed the feldspar, etc., to rapid kaolinization through allotropic modifications.

#### *Sedimentary Kaolins.*

The sedimentary kaolin beds in South Carolina range in purity from ninety-nine per cent. of clay substance to the lowermost grades. Its fluxing impurities comprise potash, soda, iron, lime, magnesia, etc., more or less combined with

silica in amounts varying from mere traces to the limits of fatal defects. These impurities occur as quartz, feldspar, mica, hornblende, limonite, pyrites, etc., its fusibility varies accordingly. In tensile strength sedimentary kaolins vary from three pounds to exceeding one hundred pounds per square inch; in combined air and fire shrinkage from one to thirty per cent. The point of incipient fusion varies from above 1815 degrees C., 3,300 degrees F., down to 1,204 degrees C., 2,200 degrees F. The peculiar form of its iron content as compared with that of the residual kaolin, limits in part its more extensive substitution for the latter. Some sedimentary clays, however, fulfill the conditions of china clays in being lean and in burning to a white body without crazing or displaying other physical defects. Plastic sedimentary kaolins, or ball clays, are mixed with lean residual clays, or other china clays, to increase their plasticity. The amounts of the ball clays added vary from one-third to two-thirds of the amount of the china clay, according to the degree of color permissible; the greater the amount of the sedimentary kaolin increasing the color of the biscuit or glaze ordinarily, but not invariably. In South Carolina there are extensive beds of pure white sedimentary kaolins exceeding eighteen feet in thickness and affording ninety-eight per cent. of clay substance, which requires no other preparation than drying. (In Florida sedimentary beds of kaolin are worked to advantage, which carry seventy-five per cent. of foreign matter, which is eliminated by washing, and these beds contribute extensively to the supply of plastic kaolin.) The sedimentary kaolins of South Carolina occur in deposits, the extent and purity of which challenge comparison with any known beds. They underlie vast areas of the Cretaceous and Eocene terranes, offering themselves for utilization wherever the process of erosion or other degradation has sufficiently removed the overlying beds of Eocene and Neocene clays and sands. Whereas these beds are in some places practically continuous for several miles, the whole is sub-divided into isolated areas with extensive intermediate barrens.

These kaolins are extensively distributed in the Savannah River area, the Santee area and the Edisto area, in the Counties of Aiken, Lexington, Richland and Kershaw. The Savannah River Area affords one of the most remarkable exposures of sedimentary kaolin in the United States, not only in its relations to quality and quantity, but in scientific interest attaching thereto. From Hamburg to Aiken we observe a zone of these clays extending fourteen miles in length by five miles in width, with numerous barrens caused by pre-eocene erosions and the degradations of recent drainage.

These beds of kaolin vary from five to twenty-five feet in thickness, with an overburden of cross bedded sands, thin laminae of clay and occasional Lafayette loams and cobbles ranging in thickness from nil to more than one hundred feet. The thickness of the kaolin determines the amount of overburden that can be economically removed. This overburden is degraded by laborers with pick, shovel and cart, or with scrapes or steam shovels, until a sufficient terrace of clay is bared for extraction. This kaolin is moved in the lump form to the dry sheds, where, after exposure to air and light for a few weeks, it is packed in casks of one ton capacity and shipped to the consumer. It probably represents the largest body of clay closely approximating kaolinite that is found in the United States. The Aiken Area also affords important deposits along Beaver Pond and Hollow Creeks.

The Edisto Area reveals interesting beds of these clays on North Edisto River, between Cook's Bridge and Merritt's Bridge and along Fox Creek; superior deposits along the South Edisto River, along Chalk Hill Creek, Juniper Creek, Marbone Creek and near Sand Dam Bridge.

The Santee Area reveals valuable beds along Thom's Creek, Cedar Creek, Colonel's Creek, Shaw's Creek, Swift Creek, Rafting Creek and Pine Tree Creek, and in some places adjacent to the Congaree and Wateree Rivers.

In addition to the foregoing class, which requires no other preparation than simple drying, there are consider-



able beds of Cretaceous clays commingled with sands which are susceptible of concentration by the usual washing process. There is a modern plant for such purpose in operation at Seivern, South Carolina.

The class of clay indicated, Middendorf, prevails in large beds in the Aiken, Santee and Pee Dee Areas. In color they are very pale greenish-yellow, but burn to a white body with quite variable shrinkage. Their tensile strength is superior to that of the whiter clays. Their extreme fineness of particle renders them much more fusible than other clays similar in composition but coarser in texture.

*Wood Pulp Kaolin.*

Many of the sedimentary kaolins occurring as described in the preceding paragraph are by reasons of their previously noted limitations devoted to the manufacture of wood pulp paper. In the manufacture of the varieties of wood pulp paper used for newspaper, and other purposes, the kaolin known as paper stock clay enters to an extent, varying from 15 to 25 per cent. of the whole, the balance being composed of ground pulp, cooked pulp and resin, in such respective proportions as 53, 17 and 5, all of which are incorporated in the cutter as a fluid pulp, the clay having first been slaked to a "slip." The ground pulp is of a short fiber, and affords the cheaper body which is strengthened by the addition of the long fibre of the cooked pulp, the whole thing cemented by resin which also contributes to the gloss, and sized by the clay which fills the interstices. Much of the clay is added, however, to give weight. The market value of the clay is about \$8 per long ton, delivered at New York, while the market value of the paper ranges from \$50 to \$60 per ton. The early deterioration of this paper is attributed in the main to the presence of the resinous matter, which affords a nutrient for fungoid growths, the albuminoids of the ground fibre also contributing to this evil. Kaolins of high densities are chiefly in demand for this purpose, for the reason that they afford a superior surface to the paper, and for the further reason that pulp with a fixed volume of space between its fibres will absorb more

weight of kaolin of high specific gravity than the same volume would represent in kaolin of low specific gravity. A clay of such density as will be retained in the fibre to the extent of 65 per cent. of the amount of clay present, when squeezed through the first rolls, is considered good paper stock clay, although some clays appreciably exceed this limit. It is required that the clay shall be white, for both white and colored papers, for the reason that the tints of nature in kaolins are perishable if of organic origin, and irregular if of a mineral nature. The manufacturer prefers to add a fixed amount of definite pigment to the white clay to insure uniformity and constancy of such color as may be required. The substitution of this clay for starch in sizing the cheaper cotton fabrics is rapidly obtaining, the advantages to the seller being obvious.

South Carolina supplies about 35,000 tons of kaolin each year to the Northern market. This entire output is derived from Aiken county.

There are, however, in other counties excellent undeveloped beds of kaolin as set forth in a special report. The following is a list of the proprietors of plants, all well equipped for mining, preparing and marketing kaolin:

McNamee & Co., Bath, S. C.

T. G. Lamar & Co., Langley, S. C.

Paragon Kaolin Works, Lamar, S. C.

Immaculate Kaolin Co., Lamar, S. C.

Peerless Clay Co., Lamar, S. C.

Sterling Kaolin Co., Lamar, S. C.

McMillan Kaolin Works, Graniteville, S. C.

#### *Fire Clays.*

While we have none of the flint clays we have in point of composition their equivalents, with the advantage of good elasticity, notably among some of the Cretaceous deposits; but in many instances the extreme fineness of the particles tends to lower their fusibility by an amount exceeding 111 degrees C., or 200 degrees F., as compared with clays of similar analyses but coarser in texture. The equivalents of the plastic fire clays, combining the refrac-

toriness of flint clays, we have in the lower Cretaceous formations, ranging in composition from the common grades to the best imported German product.

We have in South Carolina not only extensive beds of superior fire clays, but suitable clays for the sub-refractory wares not requiring more than 1,400 degrees C. temperature, at which these clays are self-bonding, through incipient vitrification; they serve well the requirements of all ordinary furnaces. But, for the minimum limit ordinarily accepted as refractory, 1490 degrees C., it becomes necessary to mix a highly refractory clay with enough of the more fusible clay, of the same approximate co-efficient of shrinkage, to thoroughly bond together the infusible particles of clay and quartz, or grog, etc., without prejudice to the required degree of porosity.

The sedimentary fire clays of South Carolina are found in the Cretaceous, the Eocene and the Neocene formations, along the zone contiguous to the fall line. Some beds of fire clay of unmistakable sedimentary origin and others of meta-residual extraction are found in the crystalline area. These meta-residual clays are employed to bond the more refractory clays and the Middendorf sedimentary beds should be serviceable for the same purpose.

The Landrum Fire Brick Works, located about three miles east of Columbia owns a bed of good fire clay.

The above indicated Cretaceous clay, which is highly refractory, is mixed with a meta-residual clay, afforded by disintegrated shales exposed on the premises. This meta-residual clay burns white and bonds the refractory clays, affording excellent results. Incipient vitrification of the meta-residual clay occurs at 1,400 degrees C. This meta-residual clay has valuable possibilities in the potter's art.

The output of the connected plant is about 900,000 fire bricks each year.

The Carolina Fire Brick Company has a well equipped plant, which produces high grade refractory wares, and brick well adapted to resisting the acid gases of pyrites furnaces. Special grades are well adapted to lining "glass tanks," and blast furnaces. The daily capacity of this plant



is 60,000 brick. The plant is located at Killian, on the Columbia-Charlotte railway.

This company owns adjacent to its plant extensive beds of a very superior fire clay pertaining to the Cretaceous formation.

*Stoneware Clay and Potter's Clay.*

Throughout the Crystalline Region we observe occasional patches of both residual and sedimentary clay suitable for the coarser grades of potter's ware, the best results are secured by mixing the residual or meta-residual clays with the Coastal Plain sedimentaries which are abundantly available for this purpose. There is an extensive body of clay near the top of the upper Cretaceous observed in Aiken, Santee and Pee Dee areas, which has not hitherto been utilized, that is eminently fitted not only for these wares but should have been and will be utilized for finer faience wares. In some localities two beds occur, one over the other, separated by about twenty feet of sands, the clay body aggregating from ten to forty feet in thickness. Whereas these clays are higher in clay base and lower in fluxing matter than is specified for the potter's wares, the extreme fineness of the particles renders them much more fusible than corresponding clays of coarser grain.

*Sewer Pipe or Vitrified Brick Clays.*

Beds of these clays occur both in the crystalline and Coastal Plain areas. Prominent beds are worked in Cherokee county, near Grover, from which point about 12,000 tons are shipped each year. In the Coastal Plain there are extensive undeveloped beds near Society Hill in Darlington county and along Scape Creek in Lee county.

*Pipe, Tile and Brick Clays.*

Brick clays occur extensively in South Carolina over the crystalline area as residual, meta-residual and sedimentary deposits. They are distributed over the Coastal Plain as sedimentary beds, and in the case of the lixiviation of argillaceous marls they occur in residual deposits.

Throughout the Piedmont Region the lower grades of clay are found residual to the extent that the altered

gneisses, feldspathic schists, etc., have escaped degradation. This degradation, or erosion, has contributed to the formation of higher grades of sedimentary, potters' and pipe clays occurring in the valleys of the crystalline region, and over the area of the Coastal Plain formation. As a general proposition, it may be said that the nearer a sedimentary deposit is located to its parent residual bed the more closely will it conform to the type of its progenitor, frequently including its softer and finer impurities, as well as the clay substance in a concentrated form, the coarser particles having been eliminated in transit; however, in some belts characteristically feldspathic, excellent residual beds are afforded. But, on the whole, the sedimentary valley beds of the crystalline formation are the most important sources of supply of these clays in this state. Characteristic of these latter supplies, we find prominent deposits at North Augusta, Brookland, Columbia, Camden, and Society Hill. Above this fall line they occur more or less through the much ramified tributary valleys. Below the fall line the Cretaceous and Eocene formations afford occasional beds answering the requirements of these clays, but in the Coastal Plain area it is not until we approach what probably represents the upper member of the Neocene formation that we find clays conspicuously valuable as brick clays. Such deposits extend from Garnett, on the Savannah River, by Walterboro, Summerville, St. Stephens, Marion, and thence to the North Carolina line, the entire distance affording an undulating zone of detached areas of good clay, some being adapted to the manufacture of high grade face brick.

Along the part of the Coastal Plain immediately within the zone of our sand islands and extending intermittently over the section ramified with bayous and other short salt water streams there occurs a mantle of red and white stratified clay, parts of which are very fine grained and most of which affords a very fair brick clay. It varies from 0 feet to 34 feet in elevation above the sea level. It is probably of late Pliocene equivalence. Clay from these beds has been employed in the neighborhood of Charleston for more than a century in the manufacture of brick and of tiling.

*Fuller's Earth.*

In England these beds form a distinct subdivision of the Triassic formation, but in South Carolina, the so-called Fuller's earths are clays belonging to Eocene and Neocene formations, and are of approximately the same composition except in the water content, which is much lower.

The Eocene beds of this earth occur intermittently across the upper Tertiary belt of this state attaining in places the depth of forty feet. There are beds in Clarendon, Sumter, Florence, Darlington, Richland, Kershaw, Williamsburg and Lexington counties, those of the first two named being the best that have yet come under the observation of the Geological Survey.

Neocene beds of a good grade occur in Colleton and Dorchester counties near Walterboro and Summerville respectively. In many localities the Cretaceous clay marls have been mistakenly designated as Fuller's earth.

## STRUCTURAL STONE.

*Granite.*

In South Carolina some granite beds have a gneissoid covering which in some instances is separated by a layer of "sap," in others by a cleavage plane, and in still other cases there is no sharp separation, the gneiss graduating with depth into granitic form. In some sections of the state there are beds uniformly gneissoid. Both the granite and gneiss are syenitic in some localities. There are deposits of one or more of these forms in every county north of a line connecting Aiken, Columbia and Cheraw, suitable for either monumental, structural or road building purposes, but many are so remote from transportation facilities as to confine their availability strictly to local use. And in so much as enormous beds are situated within easy access of the markets it is deemed sufficient for the purposes of this article to confine attention to those more readily available beds, which by reason of transportation facilities or pronounced neighborhood exigencies can claim some actual or immediately prospective economic value.

Chesterfield County affords a good bed of granite, said



to be of superior quality, at a point four miles north of Jefferson towards which two branch railway lines are being projected. There are good indications of this stone near the A. C. L. R. R., where it crosses the North Carolina state line of Kershaw county, and southwest of Heath Springs station, occurs an extensive granite area affording a considerable variety of high grade granite. The porphyritic pink granite of this section is strikingly beautiful for architectural purposes. The gray granite which is under development is of a very superior grade and finds high favor in the market, which it supplies with both dimension and dressed stone.

Lancaster county presents an enormous deposit of a superior fine grained granite near the Catawba River and within five miles of the nearest railway.

About four miles west of Lancaster appear boulders of a granite of the Scotch type excellently adapted to monumental work.

Fairfield county: Affords the most extensive occurrence of high grade granites, and is the scene of the greatest development of quarries, and of the finishing of their products, known in this state.

Rockton on the Southern Railway is connected by a spur track with the Rion, Bunwick & Anderson quarries, the properties of the Winnsboro Granite Company. They are equipped with an extensive modern plant for turning out work of any required size, design and finish. The several quarries afford a corresponding number of varieties ranging from fine to coarse grained granite. Excellent paving blocks are yielded by one of the quarries. The Stewart quarry, the property of the Stewart Stone Company, is likewise near Rockton, and has been an active producer.

Blairs on the Southern Railway is within easy access of vast beds of granite near the Broad river.

The Lieper, Davis & Company's quarries in this section have been actively operated for a number of years in supplying rough, dimension, and dressed stone of several varieties of granite, some especially adapted to best monu-

mental work. In the Blair vicinity there are several extensive properties of granite which remain undeveloped.

Chester: Along the Wateree and Broad Rivers, Chester county exposes good granite.

Richland: The Richland granite is exposed at Granby where it has long been quarried, (the greatest development of this deposit is in Lexington county across the Congaree river.) Exposures of granite are observed intermittently for several miles up the river.

York: Granite is prominently exposed on Fishing creek and along the Catawba river but has not received systematic development.

Union: Exposes a fine bed of granite near Carlisle, it stands in high repute.

Newberry: From a point two miles east of Newberry good granite is intermittently exposed as far as the county limit on the east where it joins the Fairfield bed near Blairs. The upper layer consists of enormous boulders in which the rift and grain are so true that lintels and slabs of any reasonable length are readily split. This stone has long been in use. There is no available record of the quarrying of the main body of the underlying granite from which the boulders are separated by sap.

Spartanburg: Has two quarries in operation near Pacolet station on the Southern Railway. The Keystone Granite Company and the Pacolet Granite Company are the only two operators, although much granite occurs on other properties. This stone has entered the construction of many prominent buildings.

Greenville: Exhibits a good bed of structural gneiss, near Paris mountain and elsewhere remote from transportation.

Laurens: Affords several good prospects near Waterloo and an active quarry at Cold Point, where fine curbing and other products are turned out by the Cold Point Gravel Company.

Greenwood: Affords a bed of granite near Coronado, where it has been developed to a limited extent.

Saluda: Supplies a fine mill stone granite along Clouds Creek about seven miles northwest of Batesburg.

Lexington: Reveals extensive beds of granite adjacent to the Congaree river opposite Columbia and also along the Saluda River. The quarries opposite Columbia are operated by several large concerns.

Pickens: Contributes great quantities of gneiss for railway ballast from Cedar mountain, on the Southern Railway, where it is quarried by the Beverly Bros. This rock is abundantly exposed at numerous points.

Oconee: Shows good stone, near the Southern Railway Bridge, on the Tugaloo River; also in the neighborhood of Westminster; Walhalla affords a good gneiss.

Anderson: Exhibits an old quarry two miles from Pendleton which was formerly connected by a spur track and operated to provide stone for piers, abutments and culverts of the old Blue Ridge Railway. It affords a high grade gneissoid granite.

Abbeyville: Affords good syenitic granite near the County seat and close to the S. A. L. Railway. It is difficult to split but affords a beautiful finish.

Edgefield: Has an extensive bed of granite south of the court house and near the Southern Railway. This bed has been extensively quarried by the United States Government to supply stone for jetty work. It is now operated by Capt. Ross.

Aiken: Exposes a gneissoid granite along Horse Creek, adjacent to the Southern Railway, intermittently from Graniteville to Vacluse. The product of this bed has been extensively utilized locally. In addition to the above enumerated deposits there are numerous beds in the state, some of which are utilized for neighborhood domestic purposes. Apart from the granites, gneisses, syenites, marbles and lime stones no structural stones are as yet known of commercial importance. There are vast beds of soapstone radiating from Chester westerly; extensive strata of itacolumnitic sandstone in York and Cherokee counties of value in the event of the development of local furnaces.



**Road metal:** In addition to the good road metal afforded by the granites, limestones and other rocks indicated above the following are worthy of note.

**Chert:** A large bed of this material of a superior character occurs about one mile north of Newberry where it is quarried, sized and supplied to the market from a well equipped plant operated by Cold Point Gravel Company.

**Cobblestones:** Occur at the points where the greater streams debouch into the Coastal Plain near Augusta, Columbia, Camden, and Cheraw. Beds of these loose stones are intermittently exposed on the Savannah River plateau, extending through Aiken, Barnwell and Hampton counties. Along the edge of the plateau extending from Columbia by way of Horrell Hill, to a point opposite Camden; very prominently on the plateaus adjacent to the Pee Dee River in the neighborhood of Cheraw. The latter beds are extensively utilized for railroad ballast.

**Cement Gravel:** A tenacious red clay enclosing small rounded pebbles is thus designated, and affords a fine road-bed material; chiefly utilized by municipalities. It occurs in fine beds near Beech Island on the P. R. & W. C. Railroad and is found elsewhere associated with the area indicated for cobblestones. A bed convenient to transportation occurs about one mile south of Camden, alongside the Southern R. R. Shale and slate suitable for road construction are fully exposed along the Saluda River near the Dutch Fork and also along the Broad River adjacent to the Southern Railway, north of Frost Mill, and extends northeasterly through Fairfield county.

**Roadway clay:** Clays prominently adapted to cementing sandy roadways are found in the Lafayette beds most prominently developed in the area immediately south of the fall line but also distributed irregularly over the greater part of the coastal plain, which is characterized by sandy roadways.

**Quartz:** Chloritic slates interstratified with closely alternating prolific veins of quartz occur in Lancaster, lower York, Chester, Union, Laurens, Abbeville, Fairfield, Newberry, Saluda, Greenwood and Edgefield counties.

This material is used for ballasting railways and for macadamizing roads, but for the latter purpose is inferior to either limestone, chert, granite or tough clay slate. The quartz is utilized for packing the Glover towers connected with the manufacture of sulphuric acid. The quality found near the Southern Railway between Winnsboro and Ridgeway is excellently adapted to this limited use. A very good quality of quartz for this purpose is exposed by the C. C. C. Railway, about a quarter of a mile south of Kings Creek. The entire region of the crystalline rocks of South Carolina affords in a varying degree veins of this barren quartz, some attaining the width of fifteen feet, others constituting mere stringers. Its uses are largely confined to the improvement of the neighboring highways.

An important adjunct to good roads not yet appreciated in this state is to be found in the soft marls so abundantly distributed over the Coastal Plains. It is plastic and has a high cementing quality and therefore if mixed with the prevailing sands should afford a good road plating for the highways of the lower counties.

There are also numerous exposures of marl in a very hard semi-crystallized form exhibited along the banks of the Santee river which are well adapted to the macadamizing of roads.

The distribution of these marls is indicated under a separate caption.

*Marble—Limestone.*

These two rocks are treated together for the reason that in South Carolina they intergraduate, the marble ordinarily appearing as a crystalline stratum intercolated with limestone, and as localized zones of crystallized limestones, the whole attaining in places the width of 400 feet. The most prominently revealed seam of this material extends with numerous exposures from near the North Carolina line at Grovers through Cherokee county to Limestone Springs and thence to Thickety Creek. It has been quarried at numerous points for fluxing iron ore and for manufacturing of lime, but the only point at which it is now ex-

tracted is adjacent to Limestone Springs, situated about one and a quarter miles from the southern R. R. at Gaffney, with which a spur track connects the quarry. By careful selection a fair grade of marble is obtained, which, however, is not susceptible of a very high polish. This stone affords beautiful effects in "Random Rubble" masonry especially when the points are "hammer dressed." It is excellently adapted to the structure of handsome residences and public structures. The broken stone constitutes the best of macadam metal.

The quarry is operated by the Limestone Springs Lime Works, four furnaces of an improved type being used to convert the output into lime.

Marble occurs in the western part of Union county, also in Laurens county on Reedy River, near Tumbling Shoals at Masters Kiln near the Saluda River and on the banks of the Saluda near Warees Shoals, and at intermediate points. It affords good lime and could be utilized to supply the demand for an ordinary grade of marble. A stratum of hard limestone graduating in places to marble, extends from near Tomassie Net (about nine miles northeast of Walhalla) in a southwesterly direction, being prominently exposed in the Brass Town neighborhood near the Georgia line, in which locality the crystal or marble form prevails.

This limestone, in the hard blue form, is exposed in an unused cut of the old Blue Ridge R. R., about five miles east of Walhalla.

#### *Agricultural Adjuncts—Marl.*

This subject is invested with great consequences to South Carolina, not only in its relation to prospective manufacturing enterprises in the production of portland cement, lime and sand brick, but also in its application to the improvement of agricultural lands, and to the amelioration of roadways. In quantity and distribution the beds are vast; in physical condition they range from the softness of plastic clay to the hardness of the best limestone; in quality they comprise grades exceeding ninety per cent. of calcium



carbonate; soft, fine grained and almost gritless varieties analyzing over seventy per cent. of calcium carbonate, no magnesia, and almost sufficient alumina to constitute a natural cement; soft grades high in lime, phosphoric acid and potash, thus affording an excellent fertilizer with which to effect an economic regeneration of the lands adjacent to these beds; deposits high in both lime and magnesia and therefore of value to the cereals.

These marls have greater potentialities for the permanent improvement of lands than has been realized from the chemically treated products of the phosphate beds, which are active but ephemeral and ever require expensive renewals of application. Note the example of New Jersey in the judicious application of marl to lands, and realize the most remarkable increase in productiveness, and enhancement of values. In these respects her lands, at one time poor and almost valueless, now excel the lands of our most favored agricultural sections.

Go to Bostick and other points in South Carolina, where fields were judiciously marled more than forty years ago, and there appreciate the advantages of such fields over their unmarled neighbors, separated by no more than twenty feet, localities in some cases where the better agricultural marls were not recognized, and the inferior ones were used.

Marls in South Carolina occur in parts of the Cretaceous, Eocene, Oligocene, Miocene, Pliocene and Post Pliocene formations. Their exposures are principally along the rivers and their tributaries within the lower two-thirds of the coastal plain and increasing within certain limits as we approach tide water. Thus the Edisto, Ashley, Cooper, Santee, Pee Dee and Waccamaw Rivers, and their lower tributaries, expose enormous deposits, some constituting bluffs thirty feet in height. The Ashepoo, Salkehatchie and Savannah Rivers afford marls, but of less frequent occurrence and less prominent exposures.

Along the Edisto River marl is intermittently exposed from a point four miles below Branchville to a point near the Charleston & Savannah R. R. bridge; along Ashley

River from its source to the C. & S. R. R.; along the Cooper River from its source to the Charleston Naval station; along the Santee from Half Way Swamp (Orangeburg county) to Wambaw Creek; along the Pee Dee from the mouth of Jeffries Creek (in Florence county) to Topsaw Landing, (about seventeen miles northeast of Georgetown); along Lynches River from Effingham to the Pee Dee River; along the Waccamaw River from Hammond to Bucksville.

The beds best adapted to the manufacture of cement occur along the Ashley and Cooper Rivers where good water is available for navigation. Experimental briquettes of cement made from Ashley marl exceeded by fifty per cent. the tensile strength required by the United States Army Engineer's specifications. The upper portion of the marl along the Santee River is very hard and is well adapted for road metal. The black soft cretaceous clay-marls, commonly called soap stone, which occur prominently developed along Jeffries Creek at its confluence with the Pee Dee River, and along this latter river and its tributaries, in beds exceeding two hundred feet in thickness, is an excellent agricultural marl which should be extensively utilized. It shows prominently on Bighams Branch (Florence county) at Ards Landing (on Lynches River), from which point it extends under the lower part of Williamsburg county; it also shows near old Effingham and at Hodges Mill and along the upper Waccamaw River.

In addition to the above marl beds of Greensand marl occur in this state at numerous points, their value consisting mainly in the contained phosphoric acid and potash, the latter being in the form of Glauconite (a compound silicate of potash which is but slowly soluble.)

There are two extensive plants with furnaces, equipped for mining and calcining the Tertiary marls between the Ashley and Cooper Rivers.

## Mineral Resources of Vermont.

BY G. H. PERKINS, STATE GEOLOGIST, BURLINGTON, VERMONT.

Comparatively few mines have been worked in Vermont and none of these have proved profitable in the long run. There are extensive deposits of Chalcopyrite, Copper Pyrites, in several localities, notably at Copperfield and South Strafford and two important mines have been worked in these beds, the old Ely Goddard mine and the Elizabeth mine, but only the latter is now in operation. Other smaller deposits of the same mineral have at different times been worked, but not to any profit.

Gold is found in many places in different parts of the state, but it is nowhere in sufficient quantity to pay for collecting.

Talc of good quality is found in numerous localities and is worked in one or two. Asbestos in considerable amount occurs in Lowell, Belvidere and Moretown and mines in all these places have been opened and more or less mineral taken out. It seems quite likely that in the near future Asbestos will be mined extensively in this state.

Steatite, or Soapstone, occurs in several towns and is quarried in several. Recently Platinum has been found in some of the rocks from the Plymouth gold region. Thus far but very small quantities of the platinum have been obtained. The presence of the metal seems to be certain and perhaps in the future it may be extracted in larger amount.

Formerly iron, ochre, manganese and other materials were mined in Vermont, but most of the mines have long since been given up. It is not impossible, however, that some of them may be again opened and worked, for modern methods can find profit where those of fifty years ago found only loss.

It is in her quarries rather than in mines that Vermont's mineral resources chiefly exist. And here the story is quite different from that just told.

For more than a century there have been quarries of



Marble, Slate and Limestone, and Granite was quarried over seventy years ago. In the earlier years, soon after the Revolution, these quarries were only small openings and the total amount of stone taken out was small, but the demand increased as the country grew in population and wealth, and during the past decade Vermont has far exceeded any other state in the Union except Pennsylvania, in the production of stone. This latter state greatly surpasses Vermont in the quantity of slate, sandstone and limestone produced, but in the production of the finer grades of stone, those used for monumental and interior work, Vermont by far exceeds any other state.

At first the demand for the stone from Vermont quarries was only very local, but now these products are sold not only in every state in the Union, but in every civilized country in the world. The increase in the sale of Vermont stone is shown by the following facts: In 1889 the total value of stone sold was \$1,787,283. In 1890, the amount was \$3,593,449. In 1900 it was \$4,516,102. Last year, 1903, it was not less than \$6,000,000, and there is every reason to believe that during the present year the sales will reach \$7,000,000. Not less than \$12,000,000 is invested in the quarries, and some 10,000 men are employed in getting out and finishing the stone. New quarries are constantly being opened, new and better mills built. Notwithstanding some labor troubles, there is much activity in all the quarrying centers and increased business is reported by all. Vermont is especially noted as the marble producing state. Of all the marble sold in the United States, Vermont produces more than three-fifths, and of the finest grades, monumental, statuary, interior finish, etc., this state furnishes over two-thirds. Nearly all of the true marble, that which has been formed by the metamorphosis of limestone, is found in Rutland county, though there are a few important quarries in Addison and Bennington counties. The large quarry of the Brandon-Italian at Brandon is most northerly, and the Norcross-West quarries in the southern part of Dorset, the most southerly. The marble belt, however, extends considerably farther north than this would imply, but no quarries are at

present worked beyond the Brandon quarry. These marbles are all light, except in one or two of the quarries, as True Blue and Pittsford Dark, where the black or dark blue clouding covers the whole mass. Pure white statuary marble is found in some quarries, but for the most part the stone is white, clouded or banded, with more or less numerous bands, lines or blotches of black, blue, green, brown, pink, and, more rarely, other colors. Some of the varieties are very beautiful. As has been indicated, the stone is not only elegant in color and shading, but much of it is of very fine texture. On this account comparatively little of the product of the Vermont quarries is sold for building. It is too valuable for that, since it can be sold for statuary, monuments, etc., for three or four times as much as for building. Still, in every quarry there is stone which is only suitable for building, and it is obviously an advantage to sell this for any price rather than throw it on the dump. The Chazy limestone of Isle la Motte has long been sawed and polished in small quantities and sold as black marble, and some of the layers are of excellent quality. At Swanton there is a light drab limestone, usually used for making lime, but this is sometimes finished as dove marble and some of the slabs are very dainty and pretty. In some parts of the Cambrian Red Sandrock, which runs north and south through the state, there are calcareous beds which afford the Champlain marbles. These are much harder than ordinary marble and consequently more costly, but they also are capable of a more brilliant polish, and, for interior work, are more desirable and more elegant. They are endlessly varied, no two slabs being precisely alike, though sufficiently so for practical purposes. The colors are usually reds of very various shades, and white, though olives, greens and browns are not uncommon. The colors are usually commingled, so that the effect is clouded or mottled, and many of the slabs are magnificent.

Still harder, and even more elegant, is what is called the "Roxbury marble." This is really a verde antique, a serpentine, and no finer can be found anywhere. The mix-

ture of dark and light greens and black with pure white, often seen in the Roxbury stone, produces a superb effect.

Although Vermont granite has been quarried for nearly a hundred years, at least in a small way, yet it is only within the last twenty years that it has been taken out in any large quantity.

During this period the industry has increased, and especially during the last ten years. Twenty years ago the total output was not more than \$80,000, while ten years ago it had increased to more than \$700,000, and five years ago it was a little more than \$1,000,000, while during the past year it was nearly \$2,000,000, and the present year bids fair to outdo all that have preceded.

While two other states produce a larger actual amount of granite, none furnishes so much that is suitable for monumental and other fine work, the greater amount sold by Maine and Massachusetts being largely made up of stone sold for paving and building. Very little of the Vermont granite goes into paving.

The Vermont granite is a very bright clear stone. It is all gray of various shades from "Barre Dark" to the Bethel granite which is nearly white. Some of the quarries produce a very hard, compact, fine grained stone which is admirably fitted to receive delicate designs and any sort of fine carving.

Granite is widely distributed over the state and there does not seem to be any present possibility of exhausting the supply which is practically unlimited. Thus far most of the deposits have scarcely been touched. Not only in beauty, but also in strength, durability and freedom from stain when exposed to the weather, the Vermont granite can well bear comparison with that from any part of this or other countries.

It has been said that the granite of this state is all gray, but there is on Mt. Ascutney a quarry of dark green syenite which is sold by the name of "Green granite." It is a very dark, somewhat mottled green of a rich handsome appearance and is unlike any other stone sold in the country. It has been used for columns in some of the finest buildings



in the country and at present there is being gotten out a contract for over \$80,000 worth of columns for a large bank building. It is noticeable that, while the marble of this state is quarried, dressed and sold by only about half a dozen firms, the granite is produced by over fifty companies.

The great slate belt of Vermont is nearly thirty miles long from north to south and from five to ten miles wide. It is all included in Rutland county, but extends westward into the adjoining parts of New York. Within this area there are not less than a hundred and fifty quarries, although some of these are temporarily or permanently abandoned.

Probably slate has been quarried as long as marble. The earliest headstone and hearthstones were of this material. The quarries in this region produce several varieties of slate, but no red nor black. The latter is found in other parts of the state, but no red occurs in Vermont, though fine quarries are worked just over the line in New York.

The principal varieties quarried in Rutland county are several shades of green, especially an unfading green which is much in demand in England and several shades of purple. There is also a little dark gray. At Northfield in Washington county there are several quarries of an excellent black slate which is unchanged by the weather.

Probably the first stone which the first settlers took from the ground was limestone. This was cased for foundations and burned to make lime. There are several large quarries of limestone and extensive kilns by which a large amount of good lime is made. Limestone is also sold for bridge and other supports and for buildings, the annual production being valued at several hundreds of thousands of dollars.

The quality of Vermont stone is well shown by the fact that after severe tests it has been adopted in many public buildings in widely different parts of the country. Many of the finest monuments and mausoleums are of Vermont marble and granite, the public library now in process of building in New York city, the Pennsylvania state capitol, the Union railroad station in Washington, the Harvard medical buildings are being built of Vermont stone.

## Mining Laws.

BY M. D. LEEHEY, SEATTLE, WASH.

The program committee evidently did not expect an exhaustive treatment or even a general review of this subject. Perhaps if they did so they would have assigned some one better able to treat it. But the subject is certainly too broad and comprehensive to be covered by a single paper, and it has seemed the better plan to select for discussion the recent court decisions of most importance upon the subject of mining law, and to note briefly the items of current interest. In doing so these remarks may appear desultory and rambling, but they will perhaps be the more natural to the writer for that reason.

### *Recent Decisions.*

Two important decisions worthy of special mention were rendered by the Supreme Court of the United States during the present year. Both opinions were written by Mr. Justice Brewer, and both were filed on May 2, 1904.

In *re Clipper Mining Company vs. Eli Mining and Land Company*, the court affirmed the Supreme Court of Colorado, and held that a valid placer location entitles the locator to the exclusive possession of the surface, and that no one may enter thereon to prospect for unknown veins or lodes; that any such entry constitutes a trespass; and that a discovery made upon such an entry is not a valid discovery of a lode or vein such as will entitle the locator to its possession or patent. The reasoning is cogent and conclusive. While recognizing the provision of the law that a placer location does not include any lode or vein already known to exist, yet the court says it does give the locator exclusive possession of the surface. If one person may enter thereon to prospect for lodes, then many may do so, and the possession of the placer locator would amount to nothing. It recognizes the placer miner's possession as of the highest dignity, and hence any entry thereon without his

consent is a trespass, and recurs to the already well established principle that no valid location can be initiated by a trespass.

The court decided in the same case that a placer locator may adverse in the usual manner a conflicting application for patent to a lode claim, thus determining a question of practice heretofore much in doubt.

In *re St. Louis Mining and Milling Company vs. Montana Mining Company, Ltd.*, the Supreme Court held that the owner of a vein who has the right to pursue it on its dip into an adjoining claim, must follow the vein in doing so, and cannot run a crosscut tunnel into the ground for that purpose. In other words, the court held in effect that one who has a so-called extralateral right to follow his vein into an adjoining property must work the same by means of an incline shaft run up on the vein. At least, the court held in the case cited, that a tunnel could not be run into the adjoining property to crosscut the vein for such purposes.

#### *Extralateral Rights.*

This same law of the apex, or so-called extralateral rights, still continues to be the most perplexing feature of the western mining laws and the one producing the most controversy. Although in numerous decisions of our courts of last resort almost every possible phase of the subject has been treated, and definite rules announced covering its application to almost every conceivable state of facts, yet complications continue to arise requiring further interpretation of this law, while its application to existing geological conditions presents numerous and complicated disputes as to facts. Indeed, it is safe to say that after title has been acquired to mineral lands upon the public domain, and the controversies incident to the acquisition of the title eliminated, more disputes arise over real or alleged extralateral rights than upon all the provisions of the national mining law considered together. Naturally this has suggested an amendment abolishing the apex rule and providing for a grant of larger surface with no extralateral right, and indeed a bill to this effect has been introduced into the national congress.



But a consideration of such amendment involves serious questions. We must remember that any change in well established laws, especially one of such vast importance, is fraught with the greatest danger, and must be approached with extreme caution. Before any law is altered two things should be clearly apparent: First, an actual necessity for the change, and secondly, that the one proposed will afford the relief desired. Applying this rule to the proposed amendment we should first be fully convinced that the apex rule is a mistake, and that to grant extralateral rights is wrong in principle. Then secondly, we must consider the wisdom and expediency of such a change at this time, after the experience of nearly half a century with the apex rule, under which rights have been acquired that cannot be affected by legislation, for it must be borne in mind that any change now made will apply only to locations of mineral lands made after the passage of such amendment.

Considering the first question, is the present apex rule wrong or dangerous in principle? Is it unwise to grant extralateral rights? The theory upon which such rights are granted is that the discoverer of a vein shall be rewarded with its mineral. At the time of discovery he cannot always determine the course or strike of such vein upon the surface, to say nothing about its dip beneath the surface. There are numerous instances of the vein crossing both side lines of the claim, often running at right angles to the course its locator first supposed. How then can a locator be supposed to know its dip? To protect him it is proposed to allow surface ground 1,500 feet wide. But this will only allow 750 feet from the center of his vein, even if he should be able to find that center and accurately locate the course of that vein throughout the entire claim—something which cannot be done once in a thousand times. Then to grant 1,500 feet square, or two and one-half times the size of the present claim, simply withdraws that much additional ground from exploration and development by other prospectors, for usually but one vein at a time is explored by the locator. Again, veins are usually parallel, or nearly so, and a locator learning for instance that veins in his dis-

trict usually dip southward, will not likely explore a showing along the southern boundary of his claim (unless an exceedingly rich one) for fear that it will soon be lost beyond his side lines, while his neighbor will probably not be disposed to sink even a few hundred feet in hopes of finding in his ground the vein whose apex is a few feet outside his surface lines. Of course such owners of adjoining claims might agree upon a plan of joint development and division of profits. We are told that such has been frequently done in British Columbia, which has a similar law. But then there will be a strong temptation to him in whose ground the values may be found, to attempt to avoid such contract, and we are advised that litigation has arisen even over such agreements. But more often the locator who has no extralateral rights will attempt to hold the adjoining ground until such time as the dip of his vein is determined. It will require no great stretch of the imagination to realize how a claimant can, by fictitious locations or otherwise, so involve and complicate adjoining property as to prevent its bona fide location and development. It is true that all this will be to the disadvantage of the first locator who may feel compelled to resort to such methods, but it will certainly be to the great disadvantage of the district for it will retard development.

These and doubtless many other and perhaps more weighty considerations induced the adoption of the apex rule. It has the approval of centuries of experience. Lindley, in his admirable work on Mining Law, says:

(Section 566.) "The 'dip right' of the early miner was the forerunner of the modern extralateral right. Whether, in framing their local regulations on this subject, the pioneers of the west drew their inspiration from the traditions of early German customs, which sanctioned the inclined location, received their suggestions from mining on 'rake veins' in Derbyshire, or were induced to provide for following their vein on its dip indefinitely, on the consideration that the miner might obtain more that was valuable by this method than any other, is not at this late day necessary to inquire."

The author refers to the adoption of the system under the "early German codes of the sixteenth and seventeenth centuries," but through the courtesy of Mr. William Scallon of Butte, Montana, I have been privileged to read from a translation from the Fourth Book on Metallurgy by Georg Agricola, a noted mineralogist of the fifteenth century, who in his discussion says:

"If the vein descends straight into the earth the entire area descends perpendicularly likewise, but if it be sloping the whole area will slope also and the right to the whole extent of the vein as far as it sinks into the bowels of the earth is the property of the owner forever."

But a specially strong argument for the apex rule is found in the circumstances of its adoption. What Judge Knowles in *King vs. Edwards* (1 Mont., 238; 4 Mor. Min. Rep., 480) was pleased to term the "American Common Law on Mining" is a system developed by the early miners and prospectors in their local rules and customs. We contemplate with pride the great work of those early miners, further removed in those days from the sources of supply and centers of learning than the interior of Africa is to-day, and with practically no system of government save their own roughly drafted codes, yet maintaining a standard of recognized property rights and developing a system of laws that for equal and exact justice, and adaptation to existing conditions, is the marvel of lawgivers and wins the approval of critics. A distinguished writer says:

"They reflect the matured wisdom of the practical miner of past ages, and have their foundation, as has been stated, in certain natural laws, easily applied to different situations, and were propagated in the California mines by those who had a practical and traditional knowledge of them in their varied form in the countries of their origin, and were adopted, and no doubt gradually improved and judiciously modified, by the Americans." (Section 42, Lindley, quoting J. Ross Browne in his *Mineral Resources*.)

The apex law is a developed product of those early rules and customs, and was recognized when quartz mining began in California fifty years ago. It was given legislative



sanction by Congress in the Act of 1866 and again in our present lode law of 1872. Millions of properties have been acquired and will always be held under it. Can it be said that the principle is wrong, the system unjust, or dangerous? Many of us are not prepared to believe so. But even if it had been the part of the better wisdom to have adopted the "plane" system of ownership in the beginning without extralateral rights, is it well to make the change now?

Remember that a poor law after it has been interpreted and construed by the courts will often operate more equitably than a better law which is yet unsettled and whose terms are in dispute. Remember also that any new law or amendment must pass the ordeal of the court of last resort, and that in this case is the Supreme Court of the United States, which is now three years behind its calendar. A law cannot be drawn so plainly as to leave no room for controversy or interpretation, but even if it could as to its own operation, we must yet consider the enormous litigation which will be necessarily involved in the adjustment of a new system to that already established. All locations made prior to such an amendment will possess extralateral rights. Hence one man, having acquired under the present law, may pursue his vein beneath his neighbor's surface, but that neighbor, having acquired under the proposed amendment, can follow his vein only to the plane of his boundary lines. The confusion necessarily resulting can scarcely be imagined, but it can better be imagined than described.

Nor need it be feared that if the apex rule be retained the litigation of recent years will always continue. The law is now quite definitely settled. The miner can be advised as to his rights more definitely than heretofore, and the experience of recent years will enable prudent counsel to direct a course which will avoid most, if not all, of the controversies of the past.

#### *A Complaint From Alaska.*

Those who have been in touch with placer mining conditions in the Nome region and other portions of Alaska have had occasion to complain bitterly of the abuse of the

power of attorney privilege. In many cases entire creeks have been located by a few men holding numerous powers of attorney from real or fictitious persons who have never seen the district. The evil is exceptionally glaring in the Nome region where the seasons are short, and one man has been known to locate practically all the valuable property on a creek and to hold it for a whole season without doing a hundred dollars worth of work. Under present laws, another man similarly equipped and early on the ground could locate the whole creek and hold it in a similar manner for another season. The evil demands immediate relief, but the remedy is not so easily suggested. In some quarters a demand is heard for legislation entirely prohibiting the use of powers of attorney in locating mineral land in Alaska. As there is no law at present limiting the number of claims which one man may locate, it would seem idle to prohibit the location by power of attorney without also limiting the number of claims which may be taken by one locator. Nor is it advisable to wholly prohibit location by power of attorney. Capital is required in Alaska, but most men who will endure its hardships and risk the dangers are men of limited means. The law should encourage men of capital who are willing to trust their investments there to agents. Undoubtedly the better plan would be to limit by law the number of claims which anyone may appropriate in a given district, either in person or by power of attorney, and also require certain exploration or development work to be performed upon each placer claim or group within a limited period, say thirty days after location. This could certainly be done without injustice and would doubtless afford all the relief desired.

The conditions in Alaska are different from those in our western states, and consequently some modification of our mining laws in their application to Alaska may become necessary. At the same time the hardy miners and prospectors of the Northland are so widely scattered and far removed from the legislative halls that necessary legislation is frequently delayed. A careful consideration of the interests of these fellow workers is certainly worthy of the time of this Congress.

## The Evolution of Mining in California.

BY COLONEL JOHN DAGGETT.

In behalf of California, which has been my residence for a great many years, I desire to send greetings to the delegations upon this floor of the Mining Congress, and state that California is in full accord with you, although she has not a full representation. She feels very secure in her position, for she thinks she originated the mining industry, and in whatever has transpired since gold was discovered in California she has had and still has a lively interest. California, as you know, for it is history, has done the world a service in many respects; not only in having produced a large amount of gold, silver and other metals at a period in the world's history when it performed a vast amount of good, but she has also rendered the whole world cosmopolitan. People living in a provincial way in an early day, met from all parts of the world in California; they found that each locality had its provincialisms, individuals were different from each other; but they became harmonized. The different states of the Union, not knowing one another to any great extent, had jealousies and feelings which were eradicated when they met each other and found that they were not so far apart after all. I remember a very amusing instance that occurred in an early day in California. I had some very pleasant relations with a young man from Missouri; he seemed to think a great deal of me, and I really thought he was a very nice young man. He said to me: "I don't take any stock in this feeling of jealousy that exists between the people of the East and the people of the West. I find a great many things in which one is superior to the other, but they sum up about the same. For instance, I am willing to admit that New York—that is my native state—has smarter pickpockets than they have out in Missouri; but when it comes to horse stealing, they are not in it a minute with the Missourians." Now, he was all right, he was honest, except in his standard; he didn't select the proper standard; but if he had lived until the present day,



and had witnessed the operations of J. Pierpont Morgan, Schwab and Rockefeller, he would think the booblers of St. Louis were cutting a very sorry figure.

I desire to take a little of your time to recount some matters of history. I witnessed the evolution of mining. I came to California in 1852, when the medium by means of which gold was extracted was the pan, the rocker and the long tom. Nobody throughout the United States, except a few men in North Carolina and Georgia, knew anything about the nature of gold or its manner of extraction. The great tide of western immigration brought with it a large number of practical men, who devoted their brains as well as their brawn and muscle to exploiting the gold fields of California; and to the efforts of those gentlemen we owe nearly all of the improvements that have been made in the process of extraction of the precious metals. It was the observation of individuals who had perhaps never performed a day's work before, that in adding a sluiceway to the long tom, the gold would settle in the sluice; and thus putting another sluice on they originated the system of sluicing, which liberated the man who shoveled dirt on the screen, and set him to shoveling in, and gaining the labor of one more man. That was in the line of economy.

Another individual, by directing the force of the stream of water he was using against the bank, discovered the hydraulic system, which revolutionized mining, and made it possible to extract gold from banks which were non-paying if the earth had to be shoveled into the sluice.

Another invented the system of hydraulic elevation, thus enabling ground otherwise unprofitable to be worked at a profit. Whether we owe the dredger system, which is in great vogue to-day, to California or not I cannot say; but it is in use very largely.

We found upon using the old square stamp, which you will find illustrated in your mining dictionary, and which was in use to my certain knowledge and observation up to 1860, in Grass Valley, which was then deemed to have the best means of gold extraction, that when they put the quartz into the front part of the battery it wore off the front

part of the shoe; they turned it around and it wore off the back part of the shoe, after which it did no service. Hence the revolving stamp was evolved by Mr. P. M. Chandler, a Californian, a pattern-maker of Marysville. Up to that time there wasn't a revolving stamp within the whole area of Grass Valley, which had produced millions of dollars worth of gold.

The late Mr. C. W. Lightner, formerly head manager and draftsman for the Vulcan Iron Works of San Francisco, has related to me on many occasions that he made the first draft of the involute cam. You are all no doubt aware that in the old system there was what is called a "wiper" that struck the cam in this manner (illustrating), whereupon a severe shock ensued. The involute cam commenced raising it until it got it under motion, and thus enabled them to drop a hundred or more stamps in a minute.

Some person, certainly in California, invented the screen which enabled the miner to work with economy in a great many ways, for the reason that before we had what was called the "float-battery," whatever went over the top went off.

I recollect in 1864, when I was in Nevada, I saw for the first time what was known as a "finger" in use, by means of which a man inserted a wiper between the cam and the tappet and raised it up, thus lifting the stamp. Previous to that time we had to stop an entire battery, and lift it up by block and tackle, in order to arrange a shoe. And, what may seem very strange to you, I saw in 1862, in Grass Valley, three poles near a stamp, and they had to take the stamp clear out of the battery and string it up amidship to put a shoe on. All these things, so strange to you now, have been eliminated in the quartz mining industry, and they have all been in the line of economy; and we owe it all to the engineers and practical men of California.

The great system of pan-amalgamation in the Comstock is due to the efforts of Mr. Varney to work the auriferous sulphur in the pan. They tried the Patio process, but it was a failure in the Comstock, and many of the silver mines since could never have been worked except for the pan proc-

ess. I recollect in 1864, at the Hale and Norcross mine in Virginia City, to have witnessed the operation of a machine to frame square sets of timbers which they were then instituting. That was a California engineer, Hale, of the Hale & Norcross mine. You all remember that the square-setting of the Comstock revolutionized mining, and that for a number of years Gardner Williams, a California boy, has been working the Kimberly diamond fields, which could not have been worked except for the square-setting system.

I want to say further, that the Patio process for chlorination was a matter of theory until George F. Deetkin, who was a common civil engineer, who had worked for the Watts & Eureka mine in Grass Valley, made an adaptation of it, by which means they produced their sulphurets. When I was there in 1862 they were shipping their sulphurets to Swansea, and had lost, as Mr. Watts stated to me, thousands of dollars by reason of not treating them.

Subsequent to that comes the cyanide process, with which you are all familiar, and about which I know nothing except that it is in due process of evolution, and along with all these improvements, in the line of economy, enabling the gold producing industry to work properties that otherwise could not be worked.

I have been deputed by Mr. Charles G. Gale, statistician of the mint, and connected with the Mining Bureau, to read a paper which by direction of Governor Pardee was prepared for the Mining Bureau, relative to California, and it will speak for itself.



## The Mining Industries of California.

BY THE STATE MINING BUREAU.

Those who may recall the fact that mining has been carried on in California since "the days of '49," and that it is the oldest of the mining states west of the Missouri river, may be under the impression that the mining industry is in a condition of decadence, owing to the gradual working out of the principal deposits. It may be confessed that a general idea of this sort prevails to a certain extent among those who have not taken the trouble to investigate the subject, or inform themselves of present conditions. As a general proposition mining men are naturally more interested in their own districts and states, than in those of others, for which reason they are not apt to study up details of progress in other communities than their own, unless there is special occasion for it.

It may be a matter of surprise, therefore, to many, to learn that the value of all the mineral products in California last year was \$37,759,040, an increase over 1902 of \$2,689,935. And it may be a still further surprise to know that for the last eleven years, since 1893, the increase in value of the mineral output has been about two million dollars each successive year, and the last year over two and a half millions. From this brief statement, based on the official figures of the state mineralogist, it will be noted that instead of being in a state of decadence, the mining industry of California is rapidly progressing in importance and value, and being established on a firm and permanent basis, is in first class condition. California from a mining point of view, instead of being decrepit with age, is still in its vigorous youth, and attaining greater strength as the years pass on.

California has well earned its title of the "Golden State" and the fame of its gold fields is world-wide. It is still best known in connection with this product., As a gold bearing region California has, among other mining states of the Union, the distinction of holding the record in sev-

eral particulars. It has made by far the largest aggregate product; made the largest output in any single year; made the highest annual average yield though its mines have been worked over half a century; kept the lead as a gold producer the greatest consecutive number of years; pursues the largest number of varied branches of gold mining; and has the widest geographical distribution of its gold deposits.

In support of these statements it may be noted that the gold output of the state since gold mining commenced at the end of 1848 has been to the end of 1893, according to official figures, \$1,395,377,212.

The highest gold output in any single year was \$81,294,700 in 1852. For five years subsequent it was never less than \$50,000,000. Until 1872, fifteen years later, it was never less than \$17,000,000 per annum. In 1903 it was about sixteen and a half millions and the present annual average is between sixteen and seventeen million dollars.

The yearly average gold output for fifty-five years, from 1849 to 1903 inclusive, has been \$25,377,212.

From 1848 to 1896 inclusive California produced each year more gold than any state in the Union until in 1897 the Cripple Creek mines of Colorado gave that state the lead, California then taking second place in the output of that metal, a position it still maintains. It therefore kept the lead for forty-nine consecutive years.

The branches of gold mining are: quartz, including seam and pocket; hydraulic; drift; dredging; surface placer, including river bed and bar, wing-damming, bench, ground sluice, dry washing, ocean-beach sand mining, submarine diving, and the forms where the pan, rocker, tom and sluice are used.

As to distribution of the gold deposits, aside from their forms, it may be said that California stretches through nine and one-half degrees of latitude and between the extreme northwest and southeast corners, the direct distance is 775 miles, while the width is from 148 to 235 miles, the total area being 156,931 square miles. The great range of the Sierra Nevada runs through nearly the entire length of the

state, on the eastern border, and the belt of coast ranges border the sea coast on the west. Along the Sierra Nevada range and its foothills, and the northwestern coast range, and the southeastern desert region in the tier of counties extending from one end of the state to the other, there is not a single one without its gold deposits in one form or another. There is gold on the ocean beaches of the Coast line, the mountain ranges, the foothills, the valleys. Even the sandy wastes of the Mohave and Colorado deserts have many productive gold mines. In Inyo county there are gold mines being worked at elevations of 9,000, 11,000, 13,000 and 13,500 feet, and in the same county, gold is being taken out at places over 200 feet below the level of the sea. It is thus seen that the gold deposits of California extend over a longitudinal area of 775 miles, a lateral area of an average of 191 miles (or extreme width of 235 miles) and a vertical range of 13,700 feet.

In giving some brief consideration to the present condition of the mining industry in California, as compared with its past, it may be said that the pioneers were all placer miners, and the pick, shovel, pan, rocker, sluice and long tom comprised their appliances; the gulches, ravines, river beds and bars the source of their gold. No capital was required and no extensive companies needed. Little or no development work had to be done as the claim paid or did not after brief work. Those were the days of individual miners or unorganized companies of partners. Yet even under those simple conditions they took out from ten to eighty millions a year in the first four years. The deep gravels, in the now famous ancient river bed channels were unknown, and quartz was thought little of. Gradually, however, as might have been expected, the available area of this kind of mining, was narrowed as the ground was worked out, and attention had to be turned to other sources of gold supply. This led to the discovery of the ancient channels, buried beneath the lava-capped divides, subsequently worked by drift mining; and those with no lava capping, by the hydraulic process, the cheapest operated of all forms of gold mining and having its origin in Cali-



ifornia. Attention, too, was turned to quartz, as the original source of all this surface gold.

With the exhaustion of the open surface gold deposits the day of the individual miner practically came to an end in California. Then both the character of the mining and of the mining population changed. It was no longer possible for the nomadic miner, with a few simple tools to gather a fortune in a few days from a deposit which nature had concentrated for him in a few yards of earth or gravel. It became necessary to employ both capital and labor to carry on gold mining under the changed conditions. Ditches and reservoirs had to be built for water supply for hydraulic mines; long tunnels run to tap the buried channels under the divides; and shafts had to be sunk and mills, pumps, hoists and other machinery provided before profit could be made from the quartz mines.

Thus it was that the great body of the miners stopped working on their own account, and were employed for daily wages by the companies which were organized to conduct the operations requiring investment of capital. The miners gave up their nomadic instincts, became permanent residents of the camps or mining towns, taking steady employment in mines and mills, and this condition continues to-day. Of course there are still many prospectors throughout the mining regions, as well as miners who work their own "prospects," but the majority of the mining population is now engaged in work for the companies. This has resulted in the building up of thriving permanent towns in all centers of extensive mining operations throughout the states. And many of these towns have all the appliances of modern civilization, with conveniences of transportation, far different from the temporary mining camp of the early days.

The era of speculative mining incidental to newly settled mining regions has long since passed by in California, and the business is, in these days, conducted in as legitimate a manner as farming, manufacturing, etc., profits being sought from the product in the mines themselves, and not from fictitious and evanescent "stock" values. It is worthy

of note, in this connection, that famous as San Francisco is for its mining stock speculations, the brokers have never been able to induce the gold miners of California to put the stock of their mines on the open market; and that to-day in the stock exchange no California gold mines are "listed" or publicly dealt in at the boards. The judgment which justifies this action, is the result of the experience of the far reaching detrimental features of this kind of speculation in the shares of the famous Comstock mines of Nevada; an experience yet to be learned in younger gold mining states than California. Few mining companies of any standing in the state allow their shares to be peddled indiscriminately, with constantly changing values brought about by interested speculators, rather than the merits of the mining property itself.

In the earlier history of gold mining in California, and especially in quartz many foolish and extravagant ideas prevailed, and numerous costly mistakes were made, and it came to be looked upon as a risky business. But ultimately it was found that the fault was more in the men themselves than in the mines. This is proven by the fact that hundreds of mines, after costly experiment were abandoned for years, but have since been reopened and worked on a profitable basis by those who have been guided by experience and better knowledge. A radical change in methods was necessary to bring about this favorable turn of affairs. High priced officials have been dispensed with, office force and expenses reduced, and only skilled men employed in the different departments. More railroads, better wagon roads, cheaper supplies and wages, improved means of transportation, better machinery at lower cost, highly improved reduction appliances and methods, adoption of chlorination and cyanide processes, use of concentrators and canvas plants, careful saving of sulphurets, stronger powder, power drills, electric and water power, heavier and larger milling plants, more extensive development and generally improved systems and appliances; have all contributed toward a change for the better.

The milling of gold ores particularly has been greatly

perfected of late years, and it is now possible to make quartz mines pay which were practically valueless twenty years ago, as very low grade ores may now be worked. The tendency among investors is in the direction of getting properties with large bodies of low grade ore, conditions which exist to perfection in the mother lode counties of the state.

In this connection it may be stated that as the fame of quartz mines on the mother lode of California is so wide, many persons imagine the entire quartz mining interests of the state are in that locality, and that there is little outside of it. This is not, however, by any means the case. Last year there was a production of gold in thirty-four counties of the state and the mother lode only traverses five of them. The largest gold producing county is not on the mother lode at all. The only county which produced over two million dollars last year, mainly from quartz, is not on the mother lode. Of the six counties which produced over a million in gold last year, three are on the mother lode and three are not. The largest producer in the state is, however, on the mother lode. The most extensive developments, and largest and best equipped quartz mines are on the mother lode, a section where investments must be large for success to be attained. But there are plenty of productive quartz mines outside the mother lode counties of El Dorado, Amador, Calaveras, Tuolumne and Mariposa. The county of Nevada, which has maintained the lead in gold production for many years is not a mother lode county.

The mines on that lode do not uniformly carry low grade ore, as much high grade work is found; but the ore bodies are so large that averages are reduced. It seems anomalous, however, that while large bodies of low grade ore are almost invariably sought by investors of large capital, the county which has always produced the most gold from quartz, has, generally speaking, much smaller ledges than mother lode mines, and with higher average values of the ores.

It is impossible within the scope assigned to a paper of this character to go into details of methods of operation, costs, profits, etc., refer to individual properties, or do more



than give a very general idea of the prevailing conditions. It may be said, however, with well equipped quartz mines having modern reduction works, that \$2.50 per ton will generally cover the costs of both mining and milling in California. Many large mines are operating profitably on \$4 rock, and even that of less value.

One marked instance of very cheap work may be cited, of a mine in a mother lode county, to prove possibilities of low cost where the conditions are perfect. This is the Royal Consolidated Mines Company, at Hodson, Calaveras county, Mr. J. C. Kemp Van Ee, general manager. With a carefully designed and operated 120 stamp mill and usual appliances, new and modern in every respect, they crush 800 tons of ore daily, or 6.67 tons to the stamp—a very high average. The entire cost of both milling and mining is 46 cents per ton. This is the world's record in quartz mining and milling, being lower than the cost at the famous mines in Douglas Island, Alaska, with their hundreds of stamps. Electric power is used for the entire plant, and is purchased from a power company.

Another quartz mine, the Spanish, Washington township, Nevada county, was worked for a number of years at remarkably low cost until it became necessary to hoist and pump, when it would no longer pay. The total value of the ore was only from 85 cents to \$1.25 per ton in gold, and the cost of mining was 25 cents and of milling 25 cents. The milling was done with crushers and Huntington roller mills, and over 4,000 tons a month were crushed on an average. The wages were: foreman, \$3.50 per day; white miners, \$3; and Chinese, \$1.50 per day. Water power cost 15 cents per inch. The mine was worked through two tunnels and by open cut.

Aside from the gradual improvement in the appliances and processes of quartz mining the most notable features in recent years have been the tendency toward more extensive underground development, deeper workings and the increase in capacity of the plants. Very much deeper and larger shafts are sunk than was formerly the custom and the equipment is in proportion. In reopening an old or

previously abandoned mine, of which there are many instances, they now sink a shaft from 1,000 to 2,000 feet deep directly, without stopping to run levels, until a sump is made. In a large productive mine in Amador county, they recently finished a new three compartment shaft to take the place of an old one a mile or more distant, to work the ore body at a depth of 3,300 feet, and this new shaft is equipped with a hoisting plant designed to hoist ore from 5,000 feet, which point they expect to attain in due time. Incidentally it may be stated that the ore body in the ledge at the depth of 3,300 feet is as rich as any ever found on any of the upper levels, and at some points even richer. And this is a mine which has paid several millions to its owners. The mill, placed at the new shaft, has 100 stamps.

Where they formerly thought a ten stamp mill large enough when putting up a new plant, one of forty stamps is now installed. There are numbers of mills of 100 stamps in operation in the state and several of 120 and 140, and the tendency is to still further increase crushing capacity, especially in the mines carrying low grade ore.

The quartz mines still continue to produce the largest proportion of the gold from the mines of the state. Out of \$16,988,708 gold and silver produced in California in 1903, the quartz mines yielded \$13,032,153, and the gravel mining operations—drift, hydraulic surface placers and dredges—\$3,956,555. Thus it will be seen how pre-eminent is the quartz mining branch of the industry, as it yields 76.71 per cent. of the total product for the year.

The relative standing of the various branches of gold mining (including silver output) for 1903 was as follows:

Quartz .....	13,032,153	or	76.71%
Hydraulic .....	1,102,043	"	6.49%
Drift .....	586,952	"	3.46%
{ Surface placer .....	760,021	"	4.47%
{ Dredging .....	1,507,539	"	8.87%
	<hr/>		
	16,988,708		100.00%

The auriferous gravels taken as a whole, are now not nearly as productive, relatively, as was formerly the case, this being mainly due to the restrictions placed by the laws on the hydraulic mining branch. At one time, some twenty-

five years ago, the hydraulic mines were estimated to be yielding about ten million dollars annually, though it is somewhat doubtful if the output ever reached that figure. In 1903 the yield from this source was \$1,102,043 and about half of that came from mines in the northwestern counties where there are no restrictions on hydraulic operations.

It is proper to note that while a general impression prevails that hydraulic mining is prohibited by law in California, such is not the case. But there are certain restrictions upon it, in certain parts of the state only, which have proved detrimental to extensive operations such as were formerly carried out. The civil code of the state of California contains the following section: "The business of hydraulic mining may be carried on within the state of California, wherever and whenever the same can be carried on without material injury to the navigable streams, or the lands adjacent thereto." The legal definition in the code is: "Hydraulic mining is mining by means of the application of water, under pressure, through a nozzle, against a natural bank."

The hydraulic mines are therefore only prohibited from working where the debris or tailings from their operations enter the streams and injure their navigability, or damage the farming and orchard lands along the banks. Where no such damage or injury is done, the mines continue to work. In the northwestern counties such as Siskiyou, Trinity, Humboldt and Del Norte, where the drainage of the streams of the region is into the Klamath river—a stream naturally—and pronounced officially non-navigable, there are no restrictions whatever and mines may be worked on as large a scale as desired, the tailings doing no material injury and eventually being swept into the ocean by the spring freshets.

But in the drainage basins of the Sacramento and San Joaquin rivers, where the largest hydraulic operations were formerly carried on, Congress, by special act, has prohibited and declared unlawful any hydraulic mining directly or indirectly injuring the navigability of said river systems. The same act, however, provides means by which hydraulic min-



ing may be carried on in that region, and establishes a commission composed of three officers of the Engineer Corps, U. S. A., called the "California Debris Commission," to prescribe the methods of procedure by which the miners may lawfully carry on operations.

The essential features of this federal law are that all such mines, operated under this system, in the region referred to, shall impound or restrain their debris or tailings from entering the navigable streams or injuring the lands of other parties. The California Debris Commission is empowered to issue licenses for hydraulic mining under this act, when it is satisfied that the debris dams or other impounding works are sufficient to restrain the debris. The man who desires to hydraulic must make application to the commission for a license, and submit his plans of the proposed restraining works, which are subject to approval or rejection by the commission. Each separate application is advertised for a specified time and a public hearing is held on a given date, at which those who may be opposed to the issuance of a license may state their reason. When the plans are approved, and the necessary works constructed, an official of the commission makes a personal examination, and if satisfied the debris can be properly restrained, the license is issued and the mine may be operated. But if the commission is not satisfied, for any reason, no license is granted, and the mine can not be legally worked. Even after the license is granted, if the debris, or water carrying too much of it, is permitted to escape the impounding system, the license is revoked.

The miners therefore must bear the expense of the restraining works of their respective mines. For this reason hundreds of mines, especially smaller ones, have never been started up since the enactment of the laws, the owners being unable to bear the expense of the dams, etc. Moreover, many, even extensive ones, are so situated that there is no suitable canyon or depression near by where impounding basins may be formed for the debris. Some of the mines remaining closed are two hundred or more miles from the nearest navigable river. Yet as their tailings would go into

some mountain stream or canyon, it is considered that eventually, in due course of time, the debris would reach such a navigable river. For this reason they must have impounding works just as if close by the river.

For these reasons, it may readily be seen that hydraulic mining is not nearly so extensive a business as formerly in California. The debris must be run into basins behind the dams and allowed to settle, so that the waste water will not be too muddy, or carry too much material. This system naturally restricts the amount of gravel which may be washed, and causes more expense of operation.

At one time, when the hydraulic mines were operated in a very large scale over \$100,000,000 was invested in them, including the ditches, reservoir system, pipe lines, etc. The extent of their operations, however, proved their undoing. The debris, being allowed to go where it would freely, deposited in vast quantities, injured and shoaled the streams, and covered up many acres in the low lands where farming operations were carried on. Its presence cause disastrous overflows and finally in a test suit brought by farmers, the miners were defeated, and injunctions against doing damage by the process were issued in such numbers, as to stop operations almost entirely in the central and northeastern portion of the state. It was only after the passage of the so-called Caminetti law, that the industry became partly resuscitated. These mines were at one time noted the world over for the extensive plants connected with them, and were of special interest to engineers in view of the large dams and reservoirs required, the long pipe lines, immense quantities of water under enormous pressure, and vast quantity of material mined under the system. To all miners the system is of great interest since it is the cheapest of all gold mining methods. The cost is only from one and a half to eight cents per ton of material treated, according to conditions. It was a California invention born of the necessities of handling large quantities of gravel in brief space of time, in order to make a profit.

Several of the larger hydraulic mines began "drifting" the lower portion of their gravel, when they could no longer

hydraulic the whole bank away. By this system they remove only the richer gravel nearest the bedrock and wash it on floors and through sluices or if "cemented" crush it in stamp mills. The system of "dead rivers" underlying the lava-capped "divides" in some of the counties of California, notably in Placer, Sierra and Plumas counties, has been frequently described, and it is unnecessary to go into details of the subject in this place. The term "drifting" when applied to this class of gravel mining, relates to the mode of extraction of the auriferous gravel by means of tunnels and gangways or breasts. This system is rendered necessary in consequence of the capping of volcanic lava overlying the ancient channels in which the gold is found, and rendering hydraulic operations impossible. In hydraulicking the entire face and body of the bank are removed by the piping; in drift claims, only the lower stratum of gravel lying on the bed rock is mined and washed.

The conditions of drift mining ground may be briefly described as follows: A "divide" or ridge between two deep river canyons, with the top sometimes several miles wide, mesalike and comparatively level, and having only one main slope in the direction of the ancient buried river, conceals the old channel lying beneath it. The top is usually composed of lava several hundred feet thick, and somewhere under this lava cap, and between walls of true country rock termed the "rims" is the channel of the ancient or dead river, sometimes with gravel a hundred or more feet thick; this gravel is sometimes barren of gold but more frequently is rich. The problem of drift mining is to find the position of these ancient river channels, and open them up. This is done by means of tunnels run in from the side of the divide, and when the channel is found the tunnel is continued along its course, and the lower central portion of the gravel is drifted out. Sometimes shafts are sunk to get at the gravel, where the lava cap or upper material is thin, but generally tunnels are used. These suffice for drainage and also to run out the cars with the gravel. It is not at all unusual for these bedrock tunnels to be from 4,000 to 8,000 feet in length, and there are hundreds of them in the drift



mining region. Sometimes they do not strike the channel at the point expected and have to run inclines down or make upraises to get at the pay at the end of the bedrock tunnel. Again they find the gravel has no pay and the whole work is lost. But when good channels are struck they pay handsomely. In the Red Point mine in Placer county, where recently they worked out the entire channel in their ground, the length of the tunnel was nearly 15,000 feet. In the famous Hidden Treasure mine, in the same county, there are many thousand feet of tunnel, and the gravel is removed in cars run by electric power. Detailed information concerning this class of mines may be found in the tenth report of the state mineralogist, in an article by Ross E. Browne; in the eighth report, is an article by Russel L. Dunn; and in the ninth report is an article by John Hays Hammond. This class of mining can only be carried on by organized capital, generally speaking, though there are many instances where a few men, working as partners, have dug away at bedrock tunnels for years to reach the gravel, some working for wages elsewhere to keep the other partners going in the tunnel. One reason why there are not more drift mines being operated is that much preliminary expense must be undergone before the channel is tapped, and then it may be poor, and it sometimes takes two or three years to complete the bedrock tunnels to the gravel channels.

Ordinary surface placers of all varieties are worked to a greater or less extent throughout the state, and the aggregate yield from the gulches, flats, river beds, river bars, ocean beach sands, etc., still amounts to a large sum annually.

In fact, as dredging is only another form of surface placer mining, when the results from that source are counted in with the other surface placer yield it will be seen that the output from the placers of California exceeds that from the deep gravels worked by drift and hydraulic process.

The dredge and placer miners combined made, in 1903, an output of \$2,267,560 in gold, while the combined hy-

draulic and drift miners only produced in the same period \$1,688,995. In fact the dredge mining yield alone came within \$181,456 of equaling the combined output of the hydraulic and drift mines of the state.

It seems rather an odd circumstance that while placer mining was supposed to be a thing of the past many years ago in California, that branch of gold mining is now exceeding in annual output both hydraulic and drift work, and is showing in these days a larger proportionate increase in annual product than any other form of the gold mining industry. It is a marked instance of the influence of the improvement of mechanical appliances connected with an industry. The placer deposits were not worked out as supposed. It was simply the lack of the proper tools and processes to utilize them. The early miners who worked with pan, rocker, sluice, tom, etc., were restricted to ground rich enough to pay by those methods. They were generally restricted in larger operations to ground where there was "fall" and dump, with a water supply at an elevation above. The invention of the mining dredge has changed all this and made it possible to work ground of very small value per cubic yard, and where what were formerly considered necessary features, are entirely absent.

These machines dig far below water level and pile their tailings and rocks high above ground in the pits they themselves have dug and vacated. No "fall" is necessary. The water to wash the gravel is pumped, and the gravel is washed and gold saved in the machine which digs it up. The ground worked must not necessarily be in a river bed. Dredges are now being worked far from water courses, in pits formed to float them, water being led in for the purpose. As the dredge advances the pit behind is filled with the rock and debris by the "stacker." In fact the dredge may be said to carry its float pit around with it, as it digs its way along.

To show what an era in gold mining has been brought about by new mechanical appliances of obtaining gold, it may be stated that an ordinary miner, working with pick, shovel, sluices, etc., may pick down, shovel in and wash

about two and one-half cubic yards of gravel in a working day. This would be about an average workman's duty. The dredge handles 4,000 cubic yards daily, with three men working three shifts, of eight hours each. The machinery of the dredge, therefore, represents the work of about 1,600 men, and it only takes nine men to direct it for twenty-four hours. The latest machines set at work have a capacity of 6,000 cubic yards, or equal to the hand work per day of 2,400 men, the machine, however, working longer hours of course. Taking the twenty-seven dredges operating at Oroville, as having an average capacity of 4,000 cubic yards, they are doing daily work, which it would take 43,000 men to do if these men dug out, hoisted and worked the gravel by ordinary hand work, in the old fashioned placer mining way.

Dredge mining is a comparatively new branch of the gold mining industry of California, it having been developed within the past five years. It is very rapidly increasing in importance. In 1902 the gold yield from that source was \$801,295 and in 1903 was, \$1,507,539, an increase of \$706,244, or a gain of 88.14 per cent. in one year.

In 1904 a very much larger yield will be shown as a number of new and larger dredges have been recently constructed.

In fact, this is now the most rapidly advancing branch of the gold mining industry of the state. Lands available for dredging are in great demand and are being diligently prospected in many of the counties. Lands formerly unused, or used for grazing, etc., and with only nominal value have jumped in price to \$1,000, \$2,000 and even \$3,000 per acre. The general average price is, however, about \$800 per acre. This class of mining has an advantage not common to others. That is, they can tell before commencing active operations, just about what yield to expect. The tracts are first prospected by means of Keystone drills, holes being sunk at many places, and the gravel brought up and carefully sampled. The operations, however, involve the investment of considerable capital, since, aside from the cost of the dredging lands, the machines themselves cost



from \$60,000 to \$100,000 and are expensive to keep in repair.

The principal seat of the industry is at Oroville, Butte county, where there now are twenty-seven dredges at work and others in course of construction. The operations of the dredges at that point made Butte county show the largest increased gold product over previous years of any county in the state, the increase amounting to \$652,864. Very large dredges with capacity of 6,000 cubic yards per day, to dredge sixty feet below water level, and to "stack" rocks and tailings forty feet above water level, have recently been started up in Yuba county, between Marysville and Smartsville. Machines are also operated in Sacramento, Trinity and Shasta county, and are being installed in many other places. It would astonish the old miners of early days to see the wonderful capacity of these machines, and the ease with which they are controlled and operated. Generally electric power is used, and one man, with suitable appliances, controls the movements of the dredge and its machinery.

The costs and profits of dredge mining of course vary greatly with the character of the ground, and the exact facts are not made public. It is generally supposed that the ground around Oroville will average 27 cents a cubic yard and is mined at a cost of 10 cents. Yet it is known that some machines are profitably operated on ground yielding only 11 cents a cubic yard. A large amount of this ground being dredged had already been worked by early-day miners, who sunk numerous shafts to bedrock—about thirty feet. At one time over 10,000 Chinese mined these "lava beds" near Oroville. The work of the dredges does not average over twenty hours a day, taking it the month round. Necessary repairs take up considerable time. While gold is still the principal mineral product of the state, it forms only 43.62 per cent. of the valuation of the annual mineral output of California, the greater progress has been of late manifested in other branches of mining than in gold. There are some seventy known mineral substances of economic value found in the state, and at present forty-four of these are being commercially utilized. The relation of the prin-

cial mineral products is: First, gold; second, petroleum; third, copper; fourth, clays and their products; fifth, quicksilver. The total valuation, with amounts, of all mineral substances produced in California in 1903 may be seen by reference to the following table:

## Total Mineral Product of California for 1903.

Description—	Quantity.	Value.
Asphalt, tons .....	41,670	\$ 503,659
Bituminous rock, tons .....	21,944	53,106
Borax, tons .....	34,430	661,400
Cement, barrels .....	640,868	968,727
Chrome, tons .....	150	2,250
Chrysoprase .....		500
Clays: { For Pottery, tons .....	90,962	99,907
{ For Brick, thousand .....	214,403	1,999,546
Coal, tons .....	93,026	265,383
Copper, pounds .....	19,113,861	2,520,997
Fullers Earth, tons .....	250	4,750
Glass sand, tons .....	7,725	7,525
Gold .....		16,471,264
Granite, cubic feet .....	408,625	678,670
Gypsum, tons .....	6,914	46,441
Infusorial Earth, tons .....	2,703	16,015
Lead, pounds .....	110,000	3,960
Lime, barrels .....	496,587	418,280
Limestone, tons .....	125,919	163,988
Lithia Mica, tons .....	700	27,300
Macadam, tons .....	605,185	436,172
Manganese, tons .....	1	25
Magnesite, tons .....	1,361	20,515
Marble, cubic feet .....	84,624	97,354
Mica, tons .....	50	3,800
Mineral Paint, tons .....	2,370	3,720
Mineral Water, gallons .....	2,056,340	558,201
Natural Gas, thousand cubic feet .....	120,134	75,237
Paving Blocks, thousand .....	4,854	134,642
Petroleum, barrels .....	24,340,839	7,313,271
Platinum .....		1,052
Pyrates, tons .....	24,311	94,000
Quartz Crystals .....		1,968
Quicksilver, flasks .....	32,094	1,335,954
Rubble, tons .....	1,610,440	1,237,419
Salt, tons .....	102,895	211,365
Sandstone, cubic feet .....	353,002	585,309
Serpentine, cubic feet .....	99	800
Silver .....		517,444
Slate, squares .....	10,000	70,000
Soapstone, tons .....	219	10,124
Soda, tons .....	18,000	27,000
Tourmaline .....		100,000
Turquoise .....		10,000
		<hr/>
		\$37,759,040

In the previous year the total product was valued at \$35,069,105 so that the increase in value for 1903 is \$2,689,935.

An analysis of the table shows that the total value of the gold and silver was \$16,988,708 and of the metallic substances (including gold and silver) \$20,856,660. This includes gold, silver, mineral paints, quicksilver, copper, lead, manganese platinum and chrome.

The total value of the non-metallic substances was \$2,048,638. These include borax, coal, crysopraxe, mineral waters, salt, infusorial earth, gypsum, magnesite, pyrites, lithia mica, fullers earth, quartz crystals, mica, soda, tourmaline and turquoise. The total value of hydrocarbons and gases was \$7,945,273, an increase of \$2,760,886 over the previous year. The hydrocarbons include asphalt, bituminous rock, natural gas and petroleum. The output of oil was 24,340,839 barrels, an increase of over ten million barrels over the previous year, and its value \$7,313,271, an increase of \$4,692,189 over 1902.

In structural materials there is a constant and steady increase in output and value. Their combined value is \$6,908,463, an increase of \$2,799,440 over previous year. These materials include brick and pottery clays, Portland cement, lime and limestone, macadam rubble and concrete rock, paving blocks, marble, granite, sandstone, serpentine, slate, glass sand and soapstone.

To show the wide distribution and variety of mineral substances in California, it may be stated that in 1903 that every one of the fifty-seven counties of the state—mountain, foothill, valley, coast and desert—produced one or more minerals except three. Gold was mined in thirty-four counties and is known to exist in several others. Silver was produced in twenty-six counties; brick clays in twenty-six; mineral waters in eighteen; copper and lime in fifteen; rubble rock in nineteen; macadam in sixteen; and granite in fourteen. Quicksilver was produced in nine counties; asphalt in eight; petroleum and sandstone in seven; salt in six; bituminous rock and marble in five; cement, coal, pottery clay, paving blocks and platinum in four; borax, mineral paint, lead and natural gas in three; glass sand, gypsum, infusorial earth, magnesite and pyrites in two. The following substances were each produced in one county:



chrome, chrysoprase, fullers earth, lithia mica, mica, manganese, quartz, crystals, slate, soapstone, serpentine, tourmaline and turquoise.

The following shows the gradual increase in value of total mineral production of California in recent years, as indicated by the published official report of the state mineralogist:

1893	\$ 18,811,261
1894	20,203,294
1895	22,844,663
1896	24,291,398
1897	25,142,441
1898	27,289,079
1899	29,313,460
1900	32,622,945
1901	34,355,981
1902	35,069,105
1903	37,759,040
	<hr/>
	\$307,702,667

This is a very suggestive table as it proves the statements previously made herein as to the advancement being made in the mining industry of the state from year to year. For the last seventeen years, from 1887 to 1903 inclusive, the total is \$418,851,833. The miners of California have reason to be proud of this record.

The limitations of this paper necessitate a brief reference only to the other substances than gold produced in California, though some of them are growing rapidly in importance. The state is the principal producer of asphalt and allied bitumens in the United States. Most of the asphalt produced now is made in the process of refining the California petroleum oils, they having generally an asphalt base. The lighter substance being removed the pure asphalt remains. From the counties of Kern, Los Angeles, Monterey, Santa Barbara, Santa Clara and Ventura came 41,670 tons in 1903, valued at \$503,659. The bituminous rock comes from Fresno, Kern, Santa Clara, Santa Cruz and San Luis Obispo. Borax is found in only three states of the Union—California, Oregon and Nevada—the production at present coming entirely from California. The yield in 1903 was 34,730 tons of crude material, worth \$661,400, though its value when refined is \$2,750,000. The deposits.

are mainly in San Bernardino county, although some comes from Inyo and Ventura. The output of this material is increasing, as more uses are being found for it. Brick and pottery clays are found in many counties and the annual valuation runs into high figures.

Within the past two years the manufacture of Portland cement has become a very important industry. The best lime and clay deposits lying adjacent to each other are found in Napa, San Bernardino and Solano counties, which combined produced 640,868 barrels last year, worth \$968,727. This is a new industry in California, where large quantities of imported cement have heretofore been made. Very little chrome is now produced, but arrangements have been made by foreign capital to open the extensive deposits in Shasta county. The coal mining interests of the state are not very extensive, although the counties of Alameda, Contra Costa, Monterey and Orange produced 93,026 tons in 1903, worth \$265,383.

Copper mining in California has within the last decade become a very important branch of the industry and is rapidly growing. In 1903 the state product was 19,113,861 pounds, worth, \$2,520,997. Of this over sixteen and a half million pounds came from two large mines in Shasta county, the center of the copper mining field, where large smelters have been erected. There are mines of the metal, however, being worked in fifteen counties of the state, and other deposits are known but not yet utilized. Several new smelters are to be put up at mines now being developed.

Small quantities of fullers earth are mined, and considerable glass sand is utilized by the several glass factories. The granite quarrying interests are increasing in importance and are worked in fourteen different counties of the state. The total value of the output last year was worth \$678,670. There is some little graphite, gypsum and infusorial earth, and lead mined but the values are small. The values of lime and limestone for last year aggregated \$582,268. The lithia-mica all comes from San Diego county. The quarries of macadam, concrete rock and rubble are found in many counties and the value of material of this char-

acter quarried in 1903 was \$1,673,591. This part of the quarrying industry has become very important of late, as more road paving is done, and harbor and sea wall improvements are being made. The manganese mines in the state are now unimportant, there being little demand for the material. The magnesite mines are the only ones worked in the United States. The product is used for the manufacture of carbonic acid gas and in paper manufacture as well as for making fire proof brick for furnace linings. Marble is quarried in five counties; and mica is produced in Ventura county. Small quantities of mineral paint are also mined.

California has become famous for her mineral springs, both in number and variety of chemical features. The waters are now utilized commercially, by being bottled for sale, in eighteen counties of the state. The aggregate value of the waters sold in 1903 was \$558,201. Natural gas is found, not only in the oil fields, but in other parts of the state, notably in Sacramento and San Joaquin counties, where it is utilized. There is plenty of platinum in the black sands of the hydraulic mines, but very little is saved by the miners, yet there is some annual value to the product of this metal. Paving blocks, or "basalt" blocks, are quarried in several counties, most of them coming from Sonoma county. Nearly \$100,000 worth of pyrites are mined each year, they being utilized for the sulphur contents by the powder and chemical companies, making sulphuric acid. Some quartz crystals are mined and sold to jewelers.

Quicksilver ores are mined in ten counties in California. Almost the entire output of North America has come from this state. Last year Texas produced some 5,000 flasks, and a few hundred have come from Oregon. Aside from this all that has been produced in the United States has come from California, which still produces over 32,000 flasks of seventy-six and one-half pounds each per year. The total output of the state has amounted to 1,945,125 flasks, from 1850 to the end of 1903, with an approximate total valuation of \$85,760,102. At present the production in the state is on the increase, but prices have fallen somewhat owing to overproduction. The United States does not take



even all the California product. So that much has to be exported to China and elsewhere for a market, where lower prices are obtained owing to the competition with the European product.

Large quantities of salt are produced in the state, mainly, however, from evaporation of ocean waters. The sandstone quarries in seven counties yielded \$585,309 worth last year. Small quantities of slate, serpentine and soapstone are quarried. Gem mining has within the past few years assumed some importance, the turquoise tourmaline and Kunzite coming from San Diego county and the chrysoprase from Tulare.

California supports by annual appropriation a state mining bureau, in charge of a salaried state mineralogist and a board of trustees who serve in an honorary capacity. The extensive museum of this institution, in the Union Ferry building, San Francisco, is equipped with cases showing specimens of all mineral products, arranged both by substance and county, and open to the public daily. There is also a well equipped laboratory for the determination of minerals, etc., where the public may, without cost, have specimens of any kind, identified and named. The library of technical works, and other books relating to mining and metallurgy may be used by any one for reference purposes. The state mineralogist has a corps of skilled field assistants to report on the mining conditions in the various counties or prepare special bulletins. The bureau issues county maps and registers, of the different sections of the state, in which each mine in the county is briefly described, with its exact location, extent of development, ownership, etc. The accompanying maps have the location of the mines marked upon them, and also the rivers, streams, roads, trails, etc. Bulletins on special subjects are also issued, containing full description of the mines under consideration with maps of districts and of the state, showing the location of all deposits. These bulletins are freely illustrated. Those thus far published are on the following subjects: "Methods of Mine Timbering;" "Gas and Petroleum Yielding Formations of Central Valley of California;" "Cat-

atalogue of California Fossils;" "Cyanide Process;" "California Gold Mill Practices;" "Mine Drainage Pumps, etc.;" "Bibliography Relating to Geology and Mineral Resources of California;" "Oil and Gas Yielding Formations of Los Angeles, Ventura and Santa Barbara County;" "Genesis of Petroleum and Asphalt in California;" "The Mother Lode Region of California;" "Oil and Gas Yielding Formations of California;" "Copper Resources of California;" "Saline Deposits of California;" "Quicksilver Resources of California;" "Production and Uses of Petroleum in California."

These bulletins are in addition to the usual biennial reports, and the annual statistical bulletins issued showing by counties the amount and value of all substances mined or quarried in California. This state mining bureau was established in 1880 and has grown in importance and value ever since. The annual appropriation for its support averages about \$30,000.

There is also in the state an organization known as the California Miners' Association, an unofficial body, but having branch organizations in the mining counties, all having a care for the mining industries of the state. An annual convention is held, comprised of representatives from the different counties, where matters relating to the benefit of the miners of California are discussed and passed upon. To an executive committee is left the duty of carrying out the resolutions of the convention. The main objects are to prevent adverse legislation and to suggest that which shall be beneficial to the mining interests.

## The Geology and Mineral Resources of Idaho.

BY ROBERT N. BELL, STATE INSPECTOR OF MINES.

In the nature and proportion of its rock formations, Idaho compares more closely with Colorado than with any other state. The principal feature being its enormous development of granite formations and extrusive lavas which together with their included alluvial areas occupy fully seven-tenths of the total area of the state. Of much smaller extent than either the granite or the lava, but at present of much greater economic importance in a mineral way, are the limestones and crystalline metamorphic rocks which occur in detached areas throughout the length and breadth of the state and are noted for the lead silver minerals they contain, particularly in Shoshone, Lemhi, Custer, Blaine and Owyhee counties.

In the southeastern corner of the state a limited field of unaltered cretaceous coal bearing formations are now being exploited with most gratifying evidence of disclosing extensive deposits of excellent bituminous coal.

Limited horizons of Permian formations occur in the mountains east of Pocatello, while the tertiary is represented by quite extensive areas of post miocene lake bed deposits along the western areas of the Snake river valley and contemporaneous with the basalt flows.

### *Literature on the Subject.*

Southern Idaho has enjoyed considerable attention from the officials of the United States Geological Survey, including King, Hayden, Becker, Eldredge, Russell and Lindgren, and some important and entertaining observations have been recorded. Among those of special interest at the present time are the following: A reconnoissance across Idaho by George H. Eldredge, "Sixteenth Annual Report, U. S. Geological Survey." The Mining Districts of Idaho Basin and the Boise Ridge by Waldman Lindgren, "Eighteenth Annual Report." The Gold and Silver Veins



of Silver City, DeLamar and other Mining Districts in Idaho, "Twentieth Annual Report." The last named work, issued in bulletin form, is especially interesting and instructive, and covers, besides Silver City and DeLamar, special chapters on Wood, River, Seven Devils, Warren and Florence. North Central Idaho, especially the Clearwater mountains in Idaho county, including Elk City and Buffalo Hump districts, are given a brief review by Mr. Lindgren in "Contributions to Economic Geology, 1902," issued by the survey.

The Coeur d'Alene district, of Northern Idaho, with an output of lead and silver approximating one hundred millions of dollars, has, until the present time, been singularly slighted by the Government service considering its economic importance. The U. S. Geological Survey Department published a fine topographic map of the district last year, however, and now have a corps of experts studying its economic geology. Its forthcoming report will be anticipated with a good deal of interest as the district contains distinctive features at variance with every other important lead producing district in the United States.

The most complete published account of the resources of the Coeur d'Alene is a paper by Mr. J. R. Finlay, "Transactions American Institute of Mining Engineers." New York and Philadelphia meeting, February and May, 1902, entitled: "The Mining Industry of the Coeur d'Alene, Idaho." Mr. Finlay was a resident engineer of the district for several years. His paper is a very able review of the subject and is handsomely illustrated.

### *Topography.*

The broad topographic features of Idaho are the drainage systems of the Snake and Columbia Rivers with a vast arid plain along the former and crossing the full width of the state with some prominent mountain uplifts and broad desert plateaus separating it from the great basin on the south, while north of the Snake River, extending through the British line, is a labyrinthian mass of mountains and canyons without any definite range system; a deeply eroded

broad plateau, remanent evidences of which are left along the western border of the state, where important areas are in the humid zone, and produce rich crops without irrigation.

Idaho is one of the best watered and timbered states in the Union. This statement cannot be appreciated by travelers on either of the main divisions of the Oregon Short Line Railway, which traverses some of the most desolate areas of the Snake River Valley; a trip on any of the Short Line branches in this state, however, lends a better impression.

From the bold uplifts along the northern rim of the Snake River Valley, the mountains are heavily timbered through to the northern extremity of the state and contain some extensive stretches of yellow and white pine, red fir and cedar, that will support an extensive lumbering industry for years.

The extreme elevations range from eleven hundred feet at Lewiston to a cone-shaped peak of eruptive granite thirteen thousand feet above sea level called Castle Peak in a rugged aggregation of sharp summits known as the East Fork Mountains that form a spur of the Sawtooth Range in Custer County. Elevations of ten thousand feet are not uncommon over the southeastern part of the state and along the Continental Divide, which forms a portion of the eastern boundary line; but the general elevation of the numerous ridges and summits which separate the deep cut canyons over the central and northern portions of the state are very much lower and fall away quite rapidly in the direction of the drainage to the west, affording steep grades for numerous large streams and available water power practically unlimited.

#### *The Granite.*

The granite mass of Central Idaho, with the limited areas and island-like inclusions of crystalline metamorphic rocks and igneous overflows, is probably the largest connected area of granite in the United States. It extends from the north rim of the Snake River Plain to the British Columbia line, and is from fifty to one hundred and fifty

miles broad from east to west and is doubtless connected under the sediments and lava flows with the bold uplifts of granite in Owyhee and Cassia Counties south of the Snake River Plain.

The age of the granite formations of this state vary in the opinions of the different geologists who have examined them, from Archaean to Post Carboniferous. That wide areas of them are of eruptive origin and of comparatively recent date, there can be no doubt. From the included belts of altered sedimentaries and intruded dikes that may be observed at several points branching out from a main granite base into overlying strata of limestones, quartzite and slates of known carboniferous age. This is especially true of the southeastern portions of the main mass. Further north in the canyon of the main Salmon River and through the Clearwater Mountains along the western slope of the Bitter Root Range extensive areas of coarse gneiss have been assigned to the Archaean. The granite formations of Idaho have been responsible for fully ninety per cent. of the great gold production of the state and are likely to continue of great economic importance in this respect.

### *Igneous Rocks.*

The Basaltic lava fields of Southern Idaho, estimated at 20,000 square miles, cover the Snake River Basin in a thin sheet that gradually thickens to the west where it joins the Columbia flow of older basalt and forms a narrow belt that covers a portion of the whole western tier of Idaho counties.

Some of the fresh black corrugated basalt flows that look like a recently cooled slag dump that may be observed at numerous points along the north border of the Snake River Plain are suggested by Professor Russell (Bulletin of the U. S. Geological Survey, o. 199) to have been in eruption at as recent a date as one hundred and fifty years ago.

Underlying the basalt cap at a comparatively shallow depth are five to eight hundred feet of grey, pink and brownish rhyolites and trachytes. These formations are well exposed by faulting along the borders of the valley, especially



at Heises Hot Springs on the South Fork, where they are underlaid by coal-bearing cretaceous sandstones and shales. None of the basalt or massive rhyolites of the Upper Snake River Valley have so far proven ore bearing, but a more brecciated and mineralized variety of rhyolite overlying basalt, both resting on the eruptive granite of the Owyhee Mountains, form the walls of the Trade Dollar, Black Jack and DeLamar veins, which have been famous producers of rich gold and silver ore for years.

An immense system of rhyolite dikes in the mountains immediately north and east of Boise are all gold bearing. The whole intermountain region north of Snake River shows an excessive development of igneous intrusive rocks of infinite variety with acidic types prevailing. Great cone shape mountain masses of quartz, syenite quartz; porphyry rhyolite and andesite occupy the Yankee Fork Mining District in Custer County. They rest on crystalline metamorphic rocks and the regional granite, and at Custer Mountain and Estes Mountain have been very productive of high grade silver gold ore from nearly vertical fissure veins.

These formations and their associated tuffs and breccias are continued in extensive outbursts and flows through the rugged ranges to the north in Lemhi County, where they are frequently found gold bearing en mass, but of low average value.

At Thunder Mountain the whole district for twenty miles square is filled with volcanic formations of acidic types that rest on granite and rise to numerous sharp cones and ridges eight to nine thousand feet above sea level with deep cut narrow canyons intervening that produce a rugged topography.

The prevailing formations of the rugged Seven Devil Range in Washington County are old eruptive resembling fine grained diorites and green stones that have deluged the underlying metamorphic formations of schist slate and marble, the latter being well exposed at numerous points, in the deep transverse canyons on either slope of the main range as is also in some instances the underlying granite.

Diorites and porphyries find an extensive development

in the lead and copper bearing limestones and quartzites of the Wood River, Lost River and Birch Creek Mountains in Blaine, Custer and Lemhi Counties and are intimately associated with the ore bodies.

Intrusive dike rocks are less prevalent in the northern part of the state, but they are not entirely wanting in any of the developed mining districts.

*The Metamorphic Formations and Limestones.*

This important division of Idaho's geology finds its greatest development covering an area of five or six thousand square miles over parts of Lemhi, Custer and Blaine Counties, a limited but very important area in Shoshone County and several other limited areas and narrow belts in Kootenai County and along the southern border of the state.

These formations have made Idaho famous as the leading lead producing state in the Union. Their petrographic character has never been closely studied, but they are supposed to range all the way from Algonkian to upper Carboniferous in age.

From where it strikes almost due east near Gibbonsville in Lemhi County, the Continental Divide is a bold, clean cut mountain range for seventy-five miles to the southeast. Its sharp crest of bare rock is broken by a succession of pyramid peaks that mostly exceed ten thousand feet in altitude, consist entirely of crystalline metamorphic formations that range from true vitreous white quartzite to schisty grey slates and greywacks, often excessively contorted and containing comparatively few dikes of intrusive rock, which are of a heavy basic variety. These formations in color, texture and general field appearance very closely resemble the formations of the lead producing center of the Coeur d'Alenes. They have been provisionally assigned to the Algonkian by Mr. Eldredge. They are extensively fissured and contain numerous prospects noted for coarse specimen gold ore, usually associated with lead and copper minerals.

Near the southeastern corner of Lemhi County, the

lower flanks of this range show a remarkable development of heavy bedded, rather coarse grained, pink and white quartzite and blue limestone. At Skull Canyon, near Kaufman Postoffice, the successive beds of clean massive blue limestone and lime breccia rich in middle and upper carboniferous fossils aggregate fully four thousand feet thick.

Southwest of the main range from Nicholia, the Birch Creek, Little and Big Lost River Mountains are really three lofty spurs that put out from Salmon River Mountains carrying numerous elevations of ten and eleven thousand feet. They extend southeast as fairly regular ranges for thirty or forty miles and suddenly drop off to hog backs and isolated buttes in the western edge of the Snake River Plain.

These are typical desert ranges of deeply faulted and fractured formations that are almost devoid of surface streams in spite of their great elevations and deep snows. Their formations consist of massive blue, grey and drab limestones, dolomites and marbles, fine grained quartzite and enormous intrusions and outbursts of diorite syenite and feldspar porphyry. They are rich in lead, copper and iron minerals. Present idle conditions for the occurrence and development of profitable ore bodies, are easy of access, and afford a very inviting and extensive field for exploitation. West of these spurs the main mass of the Salmon River Mountains consists of great folds of diabase schists, Cambrian quartzites, true slates and some limestones with an extensive development of tertiary lavas, especially along the main Salmon Canyon where massive flows of rhyolite and andesite predominate.

In the vicinity of Bayhorse, Clayton and Slate Creek, pronounced fissure veins occur closely associated with dikes of greenstone that contain some famous producers of high grade silver lead and silver copper ore.

The Wood River formations are a sharply folded series of quartzites, slates, grey limestones, dark shale and slates of carboniferous age, associated with great bodies of quartz diorite, andesite and eruptive granite of more recent date. This district is very extensively fissured and richly mineralized with high grade silver lead and some gold ores. It con-



tains some noted mines that have laid dormant for several years. Until recent interest in them has been renewed by the bonanza ore disclosures in the deep levels of the Minnie Moore mine, the occurrence of which below a depth of one thousand feet in the vein lends the impression that the ore resources of the district have by no means been seriously depleted.

South of the Snake River Plains metamorphic sedimentaries warp about the island-like uplift of diorite, forming South Mountain in Owyhee County, and contain large fissured zones of fine concentrating silver lead ore in schist and crystalline limestone, which, while quite zincy, carry important compensating values in gold and copper.

#### *Idaho's Metals and Minerals.*

The most important metal output of Idaho at the present time is lead, in the production of which this state excels, in its famous Coeur d'Alene district, any other lead mining district in the world.

During 1903 ten mines in the Coeur d'Alenes produced something over a million tons of crude ore that yielded one hundred thousand tons of lead bullion and five million, five hundred thousand ounces of silver, showing a yield largely increased over 1902, and current operations indicate a still greater yield for 1904.

The Coeur d'Alene mines are operated on master fissure veins and sheeted zones in a deep series of metamorphic sedimentaries of unproven age, consisting of sharply folded quartzites and slated siliceous argillaceous rock called greywack, closely resembling the extensive development of similar formations in Lemhi County which are thought to be pre-cambrian. Limestone is entirely wanting and intrusive dike rocks are scarce. This, together with the deep seated fissure character of its deposits, gives the district an individuality different from that of any other important lead producing district in the United States.

Taken as a whole, the product of the Coeur d'Alene mines is low grade, but there are several notable instances where zones of secondary enrichment have produced a con-

siderable tonnage of carbonate ores rich in silver. The principal producing ore bodies are remarkable for their great width, lineal extent and persistence in depth. Several of the more important ore shoots have been exploited and proved to depths ranging from fifteen hundred to twenty-five hundred feet below the crests on the dip of the steep pitching fissures in which they occur with no deterioration in volume of ore, or in lead or silver values, nor do they show at those great depths any serious increase of objectionable foreign sulphides.

Some of the most productive ore bodies show their highest crest at considerable depth below the apex of the fissures and make a very inconspicuous surface outcrop. The numerous new properties undergoing active development in the district are bound to bring in new ore bodies occasionally, and to maintain its lead for years, for experience teaches that with the discovery of a new ore body of any extent in this district, its future productiveness can be about as definitely figured on as a coal deposit.

The principal ore produced in the Coeur d'Alenes is silver bearing galena which occurs as narrow bands of clean mineral along the planes of movement in the vein and disseminated through the sheeted and shattered quartzose rock, there being comparatively little true quartz or other gangue minerals with the ore in the veins. The common accessory minerals are zinc blend, iron spar and pyrite. Grey copper, chalcopyrite and barite have been noticed sparingly in some of the mines. There are several extensive ore bodies in the district, at present not being worked, that carry an excess of zinc and pyrite associated with the lead, but the bulk of the concentrates now shipped from the district are remarkably clean and practically free from objectionable percentages of zinc.

#### *Other Sources of Lead Ore.*

At the southern end of Lake Pend d'Orille, in Kootenai County, in a formation of limestone and quartzite, a great lode of good grade concentrating lead ore, ten to fifty feet wide, has been developed to the extent of several thousand

feet of tunnel work. Still further north, near Port Hill, the Idaho Continental mine has been developed on a wide fissure vein said to show thirty feet of good concentrating galena lead ore of good grade, and also to carry a pay streak one to three feet of clean mineral worth sixty per cent. lead and thirty ounces silver per ton.

Between 1882 and 1887, the Viola mine at Nicholia, near the southeastern corner of Lemhi County, produced one hundred and fifty thousand tons of ore that yielded at the rate of sixty per cent. lead and twelve ounces of silver per ton from a single lens shaped body of clean sand carbonate mineral, that was one thousand feet long, five to seventy feet thick, and was followed on a flat dip for nearly two hundred feet, where it merged into a body of soft brown iron gossan ore, fifty feet thick, all carrying a little lead, in which condition it has laid idle ever since, an interesting possibility of the recurrence of a similar monster lead ore body at further depth below the iron gossan. This deposit is in blue limestone near a quartzite contact. It has recently gotten into the hands of some successful mining people and is likely to be extensively developed in the near future.

On the opposite side of Birch Creek Valley in one of the lofty limestone ranges, previously described, there are dozens of handsome silver lead prospects extending along a wide belt of very favorable formations for a distance of fifteen miles on the northeastern slope of the range, several of which have shipping ore, and from recent reports, the Gilmore mine, near the center of this belt, is assuming bonanza proportions. It has developed an ore body in limestone about two hundred feet deep by three hundred feet in length, and by two to fifteen feet thick, that is largely of shipping value. The owners are at the present time giving steady employment to fifteen heavy freight teams hauling the ore to the railroad, eighty-five miles distant (but over one of the finest natural roads in the world) from where it is shipped to the Salt Lake Valley smelters. The ore is lead carbonate sprinkled with galena, and is shipped direct from the mine without milling and carries



average values of between fifty and sixty per cent. lead, thirty to forty ounces of silver and one to two dollars of gold per ton. The ores of this district occur both as fissure veins and contact deposits and for extensive development it promises a resource of ore that may justify railway transportation at no distant date.

The principal silver lead mines of Custer County at Bayhorse, Clayton, Squaw Creek and Slate Creek, which have only been worked in a desultory manner since 1890, are likely to soon again become active producers under a merger of interest that is being negotiated.

These mines have a bullion record of something like \$10,000,000.00 and have lead and silver ore reserves now in sight estimated at \$3,000,000.00.

The Minnie Moore mine at Bellevue, in the Wood River District, after being practically abandoned as worked out and left for twelve years, was taken hold of by more enterprising spirits who have been operating in bonanza ore from the nine hundred to the eleven hundred-foot level, shipping for a good part of the time during the past eighteen months from fifteen to thirty cars per month of crude ore and concentrates that have averaged fifty to seventy per cent. lead and from sixty to one hundred and twenty ounces of silver per ton. The successful reopening of this old bonanza, which is the deepest mine in the district and had a previous record of \$7,000,000.00 production, has strengthened the faith of other operators in the field and a good deal of intelligent development work is in progress with definite prospects of other rich ore disclosures of considerable extent.

The South Mountain mines contain a very extensive resource of fine concentrating lead ore containing a good deal of zinc, but also very important values in both silver, gold and some copper, a combination very much resembling the ores of Park City, Utah, and while this district is at present somewhat remote from railway transportation, the rapidly growing demand for the metals, together with its natural geographical advantage, will naturally bring it into market before very long.

These are a few of the principal lead silver bearing districts in the metamorphic rocks of Idaho, whose development will assist the Coeur d'Alenes to maintain this state's present prestige in the matter of lead production indefinitely.

*Gold.*

Idaho first came into prominence as a gold producer by the discovery of rich placer diggings on the North Fork of the Clearwater River in 1860, at a place called Pierce City, now situated near the southern end of Shoshone County. From there the hardy pioneers extended their search over the rugged intermountain sections of the state, resulting in the discovery of a dozen other districts that subsequently became famous producers.

According to conservative estimates, the placer districts of Idaho, from discovery to date, have produced gold bullion to the total value of \$200,000,000.00, and while the rich and easily available diggings are practically exhausted, the placer product from deeper ground that has been equipped with modern machinery at several points in the state, amounted to over forty per cent. of the \$2,000,000.00 worth of gold produced by Idaho mines in 1903.

A most interesting feature of the occurrence of these placer deposits, from the northern end of Shoshone County to the district around Silver City south of the Snake River is, that they are almost invariably confined to the granite formations. The most extensive and productive placer district in the state was that of Idaho Basin, forty miles north of Boise City, the state's capital, which alone is credited with an output of \$100,000,000.00.

The chief source of the lode or vein gold produced by Idaho mines in the past has been from the mines of the Yankee Fork, Atlanta, Rocky Bar, Silver City and DeLamar districts. These mines are of the Comstock type, true fissure veins in volcanic formations of Tertiary age, containing rich gold and silver bearing silicious milling ores. Their combined output to date may be conservatively estimated at \$100,000,000.00, of which probably \$50,000,000.00 was

gold and the balance silver. The mines of these districts have continued in more or less continuous production for forty-two years. Three of them, the Trade Dollar Company and DeLamar in Owyhee County, and the Lucky Boy at Custer City, Custer County, produced gold and silver bullion of the coinage value of \$1,663,000.00 during 1903. In the light of modern mining experience, the many evidences of mineral still remaining in these famous old districts, together with the cheaper methods of milling, now in vogue, make it safe to predict that they will continue to produce an important yield of precious bullion for some years to come.

The production of gold in Idaho, especially from original ore sources, and as a bi-product from the treatment of other ores, is destined to increase very rapidly and it is not unlikely that sensational disclosures may be made in some of the more remote districts such as have characterized the gold mining history of Colorado.

Rich gold-bearing tellurium ores are reported from several districts in this state, but the writer has only seen this mineral in one of them, at Elk City, in Idaho County, where it occurs in bunches associated with rich gold-bearing pyrites in a ten-foot fissure of white quartz accompanied by a small porphyry dike in walls of Archaean Gneiss. The tellurium ore was of the variety petzite and occurred near the water level. Above that level the vein was oxidized and was very successfully operated during 1903, producing bullion to the value of about \$75,000.00, with a ten-stamp mill. Several districts in the granite and porphyry formations further south are rich in fluorite and fluorspar, the common associations of tellurides. In many instances these districts have been very imperfectly prospected and favorable inferences may be drawn from these conditions for the future discovery of rich gold ore deposits.

The principal increase in gold bullion production in this state, however, will come from its extensive deposits of medium and low grade ores and from its low lying placer beds that are being equipped with hydraulic and dredging machinery, several plants of which have been installed or are in prospect.



The Buffalo Hump District in Idaho County gives definite evidence of being able to increase the gold output of the state at no distant date by \$1,000,000.00 per year. This is one of the most promising gold districts in the West. The Hump is a hog-back elevation of eruptive grey granite eighty-eight hundred feet in elevation and the highest point, is a densely timbered region of broad granite ridges and deep-cut canyons fifty miles square.

This district is traversed by a well defined system of large gold-bearing quartz-filled fissures that carry pay ore in bodies five to twenty feet wide and in places several hundred feet long.

The Jumbo mine, originally not considered one of the best surface showings, but cropping in the walls of a deep cut canyon lent itself to ready development by adit tunnels, of which it has three, exposing two ore shoots to an extreme depth of five hundred and twenty feet by an aggregate length of five hundred and fifty feet, and from five to seventeen feet wide, of ten to twelve dollars average gold values, and has a fourth adit under construction that promises to double the present ore reserves.

This property has practically paid for its own development with a four-stamp prospecting mill. It is now equipped with a twenty-four-stamp mill that has been in operation since January 1st, producing from twelve thousand to fifteen thousand dollars in bullion per month, and piling up tailings values of about seven thousand dollars per month to be handled by cyaniding.

The Cracker Jack mine in the same district is operating a ten-stamp mill on an ore body that is ten to twenty feet wide and several hundred feet long, of a little better grade than the Jumbo.

The fissures of this district are usually nearly vertical with clean cut walls frequently beautifully polished. True dike rocks are rare, but veins and irregular segregations of coarse pegmatite and inclusions of schist are common. The filling of the ore shoots is ribbony to massive white quartz, usually well sprinkled with iron sulphides, together with some copper and lead sulphides. The lead, as in most other

Idaho granite gold districts, usually indicates higher gold values. These ores, as far as treated, yield from forty to sixty per cent. of their gross value to plate amalgamation and a high percentage of the balance can be recovered by concentration and cyaniding. There are a number of properties undergoing development in this district at the present time, and as a rapidly increasing source of gold bullion, its future is assured.

The Elk City Placer District, north of Buffalo Hump, is developing some good mines and produced seventy-five thousand dollars' worth of quartz gold last year and has an exceedingly promising future.

The Big Creek District, thirty miles north of Thunder Mountain, has some monster fissure veins and contact deposits in granite, white porphyry and metamorphic rocks, that are being quite actively developed, and are reported to be showing fine paying values in widths varying from ten to two hundred feet.

At Thunder Mountain the gold occurs in sheeted flows of pyritic rhyolite and volcanic tuff. The Thunder Mountain Company's property has been successfully operated during the past year with a light ten-stamp mill. Several thousand feet of development has been done in this district during the past year and the values found under ground are said to far exceed the surface indications. The completion of the State Wagon Road to Thunder Mountain is promised by September of this year and a large amount of machinery is already headed into the district from the railroad.

At Indian Creek, in Lemhi County, the Kitty Burton Mining Company completed a thirty-stamp mill last fall which has since been in successful operation, producing gold bullion of the net value of from fifteen thousand to eighteen thousand dollars a month. This mine is operated on a contact vein, five to twenty feet wide, of granular quartz carrying from \$5 to \$20 gold per ton and yields a high percentage of its value to plate amalgamation and tailings values yielding readily to cyaniding. The formation is a schisty quartzose rock, and the vein is accompanied by a small dike of

feldspar porphyry. The surrounding district has many promising prospects.

The recent discoveries at Loon Creek, in Custer County, promise an important new source of gold. The Lost Packer mine has developed an extensive reserve of rich gold-bearing chalcopyrite ore. It shipped five carloads last year which averaged eight ounces gold and ten per cent. copper per ton. The owners of this property are constructing and extending a wagon road into this district, twenty-five miles from Custer City, and are anticipating a big production in the near future.

The Lost Packer mine is opened by adit tunnels on a nearly vertical fissure that crosses a deep canon in a formation of eruptive granite and grey porphyry. The vein is from five to twenty feet wide of milling ore, and carries pay streaks one to three feet wide of almost clean chalcopyrite that also contains a sprinkling of bismuth sulphide and invariably runs high in gold, up to ten ounces per ton. The Loon Creek District is richly mineralized and is attracting a great deal of attention at the present time.

The Valley Creek Mine, twenty-five miles south of the Loon Creek District, has recently been equipped with a twenty-stamp mill and cyanide plant. This mine is opened on a monster fissure in granite associated with large dikes of porphyry. Its ore bodies are as much as thirty feet wide, containing average gold values of eight to twelve dollars per ton and the amount of ore now exposed is said to exceed a third of a million dollars in gross value.

On the opposite slope of the Saw Tooth Range in Blaine County, the Hailey District has a gold belt of no mean importance. The Creosus Mine, within four miles of Hailey, is being developed with a three compartment vertical shaft to be 1,000 feet deep and has already reached the 700 foot level.

This is nearly vertical fissure in diorite following a narrow dike of andesite. It is as much as forty feet wide, in certain shoots, of concentrating pyrrhotite and chalcopyrite ore, said to carry average gold values of from five to fifteen dollars per ton and often carrying pay streaks of



clean sulphide ore that runs several ounces in gold. This straight gold copper ore mine has had the remarkable experience of developing a considerable body of high grade lead silver ore in its lower levels, which would indicate that the extensive field of diorite and eruptive granite is in part, at least, an overflow or overthrust and is underlaid with the lead-silver bearing Wood River series that bound it to the north and east.

A few miles west of the Creosus in the eruptive granite of the Hailey gold belt proper, the Tip Top Mine is the deepest shaft developed gold mine in the state. It has been explored to a depth of 1,100 feet on a steep pitching fissure vein accompanied with a small basic dike and developed its largest and richest ore body at and below the 900 foot level which is five feet wide and several hundred feet long, and is said to contain an average value of nearly an ounce of gold per ton. The ore is a white quartz, well sprinkled with pyrites. The property has elaborate equipment, including a fine mill and should contribute an important output of gold in the near future.

Another important gold ore development of Blaine County is now being made at the Liberal Mine in the Little Smoky District, where some large contact bodies of gold bearing iron pyrite ore are being exposed in walls of granite and porphyry and are exhibiting the evidences of a very extensive reserve of pay mineral which will justify deep development and a large mill.

The entire drainage basin of the Boise River, including the Pearl District, is on the low divide between the Boise and Payette Rivers, and all conveniently accessible from Boise City, presents one of the most extensive and most promising fields for gold mining investments in the West.

This great field, which includes among its districts, Idaho Basin, Rocky Bar and Atlanta, has produced gold constantly since 1862, and a total amount which would be equal to an annual yield of about \$2,000,000 a year if equally distributed over the whole period of production. The industry has been at a low ebb for several years, but has picked

up lately and the disclosures recently made in some of its old districts, as well as in new discoveries in its virgin fields, are such as to warrant the anticipation that it may again assume the importance of its palmiest days as a gold producer, for while its rich placer deposits are about exhausted, it has gold-bearing vein croppings containing pay values at the surface and invariably of the granite and porphyry contact or fissure class, by the thousand.

The ores of this field at a comparatively shallow depth are generally more or less base, that is, the gold is found associated with iron pyrites and also often with a light sprinkling of lead, zinc and antimony sulphides. This condition is largely responsible together with inadequate capital, misrepresentation and mismanagement for a number of small mining failures.

In comparison with the extensive development that has been necessary for successful mining in many other western fields, the Boise River region has barely been scratched, and its most promising districts worked in a half-hearted manner where manifest evidences of great ore resources exist.

The Checkmate Mine at Pearl was worked by its former owners to a depth of 500 feet by sinking one level at a time, gouging out the ore, then sinking another, and so on. This mine is reported, from good authority, to have produced approximately \$100,000 in gold for each level, but it is doubtful if the method of operation employed was very profitable. The property carries four or five parallel fissure veins of about equal surface strength. All the work was confined to one and its ore bodies expanded from sixty feet at the surface level to five hundred feet in length at the fifth level, by an average width of something like four feet and an average value of about \$10 per ton. This property has come into new hands within the past year and its development is being undertaken on a broader plan.

The Lincoln Mine on the same belt, has been under development for three years for a total depth of 300 feet, and has a remarkable showing of pay mineral conservatively estimated at \$500,000 in sight.

This mine is opened on a sheeted fissure zone of altered and mineralized granite. It has exposed an ore shoot of disseminated and banded sulphide mineral which is from two to twenty feet wide and continues along the strike for 1,100 feet, carrying an average gold value of from \$8 to \$10, and occasionally pay streaks of clean mineral a foot or more thick which run three to eight ounces of gold. This mine has recently put into commission a six-foot Chilian mill and is reducing about 150 tons of ore daily.

At Quartzburg, the Gold Hill and Pioneer claims have been worked to a total depth of 400 feet and have exhibited almost continuous ore for 1,500 feet in length.

This property is idle at the present time. It was equipped with an old fashioned hand-fed mill that was run almost constantly for twenty-five years, prior to 1894, and was subsequently destroyed by fire. This property is credited with a total production of \$3,000,000. The ore was a gold-bearing iron pyrite in a shattered fissure zone in a porphyry and in bodies ten to forty feet wide, worth \$6 to \$10 per ton, and in small contact vein between porphyry and granite, one to six feet wide, carrying much higher values. About fifty per cent. of the value of the ore was savable as free gold, and the only method of keeping track of the values in thousands of tons of tailings which were allowed to run to waste, was the gold pan, as there never was an assay outfit on the ground.

At Neal, fifteen miles east of Boise, the Golden Eagle Mine is opened on a mineralized fissure zone in granite resembling the Lincoln at Pearl. It has 1,000 feet of actual development work from which \$40,000 worth of ore has been shipped and included several carloads which sampled over five ounces of gold per ton. The pay ore in this mine is from five to twenty-eight feet wide and its development consists of a 300-foot incline shaft and three short levels.

The Monarch Mine, at Atlanta, after lying idle for a number of years, was taken up two years ago by some Colorado operators. It has since been undergoing systematic development with the result of putting in sight a very ex-



tensive reserve of good pay ore and proving the inadequacy of its former development and exploitation.

The Franklin Mine, at Pine, which was equipped with a ten-stamp mill and through poor management was abandoned and left idle for ten years as a deserted failure, until two years ago, when it was taken hold of by more intelligent hands and has produced bullion to the value of \$150,000 with the same old stamp mill within the past eighteen months, and at this date has an ore reserve estimated at half a million dollars.

Twenty miles north of Atlanta, on a tributary of the Middle Fork of the Boise River, a new district called Black Warrior, is showing up some very fine surface ores. Numerous specimens are being sent in, and in some instances moss covered and well sprinkled with visible native gold, said to be taken from the croppings of great contact veins of quartz five to fifty feet wide, in walls of granite and porphyry, and carrying pay streaks of a foot to eight or ten feet wide which sample \$10 to \$30 per ton.

Such are some of the more promising features of the Boise gold fields. Its numerous ore deposits, invariably of the fissure class, have been developed to a very limited extent. In depth they vary from a simple fissure filled with a narrow band of quartz to a wide fault fissure zone of mineralized country rock of the Lincoln type of which there are several in the field which bear all the structural evidences in their shallow horizons of continuing and carrying their values to great depth and producing millions of tons of pay ore.

*The Silver City De Lamar District.*

This district is situated in the Owyhee Range, its veins are not very large, but they are rich and very persistent in length and depth. They occur as nearly vertical fissures cutting eruptive granite and surface flows of tertiary basalt and rhyolite.

The Trade Dollar Consolidated Vein has been operated for twelve years and has produced \$10,000,000 worth of gold and silver, of which two-thirds was silver. Its connected underground developments extend along the strike of the

vein for two miles in an extreme depth of 1,700 feet. The mine is in successful operation at the present time and produced bullion to the gross value of about \$500,000 during 1903.

Four miles below the Trade Dollar Vein on the same creek, the DeLamar Mine has been developed on a close parallel system of fissures in rhyolite which seemed to cut off or stop at a blue clay fault plane where the ore shoots had attained their greatest width and richest values. That these ore shoots received their pregnant solutions from this fault plane seems most unlikely, and that they may be picked up on the opposite side of this rather obscure displacement in all the glory of their former bonanza values is one of the possibilities of extensive development along that line. The mine is still in successful operation, has large reserves of low-grade ore and yielded \$300,000 in 1903, over ninety per cent. of which was gold. This mine is credited with a total yield up to date of \$8,500,000.

This district has many geological features in common with Cripple Creek, Colorado. It contains a number of fine prospects and its partially developed properties carry rich surface values and warrant extensive development.

#### *Silver.*

The chief source of supply of the white metal in Idaho is as an associated value in lead ores of the Coeur d'Alenes, Wood River, and from the Trade Dollar Consolidated Mine at Silver City, the latter being the largest producer of any mine in the state in which silver is the principal product sought. The output of this mine alone during the year 1903 amounted to about 700,000 ounces. The normal increase of the Coeur d'Alene mines this year together with a largely increased yield from the Minnie Moore Mine at Wood River, which for several months has been shipping 900 to 1,100 tons of ore per month worth from fifty to seventy per cent. lead and seventy to one hundred and twenty ounces of silver per ton, together with an important yield from the big copper smelters of the White Knob Copper Company at Mackay, and an important new source of lead silver ore now

going to market from the Gilmore Mine in Lemhi County, give definite evidence of an increase of fully two million ounces for the state for the year 1904.

One of the largest silver mines in the state is the Rams-horn at Bay Horse, Custer County, which has been idle for several years. This mine is a true fissure in slate that strikes due north and south and dips west at fifty degrees. It has produced silver to the value of \$2,000,000 in the past, has ten miles of connected underground development and ore reserves now blocked out containing about three million ounces. The ore is a grey copper in a gangue of iron spar. This mine is adjacent to a rich silver-lead district and a merger of interests is being negotiated that is likely to bring this mine and district into heavy production again within a year.

### *Copper.*

The copper resources of Idaho are varied and extensive. This state is destined to become a very heavy producer of the red metal at no distant date. Many of our largest copper ore deposits are situated at considerable distance from railway transportation, which fact has retarded their development, but engineers and investors are commencing to appreciate the fact that the present enormous consumption of, and rapidly increasing demand for copper, is more than keeping pace with its production and development. The larger bodies of copper ore in the remote districts of Idaho are already attracting investors with a view of future demands. Idaho's copper ores are invariably associated with important values in gold and silver, especially gold which together with the natural economic advantages that usually surround them in the way of water for power, timber and tunneling advantages, will afford important aids and inducements to their exploitation.

The principal source of copper bullion in Idaho at present is from the property of the White Knob Copper Company at Mackay, in Custer County. This property is equipped with a large new smelting plant which has been run with little intermission since the first of the year, treating from



300 to 600 tons of crude ore a day which yields high grade matte containing good gold and silver values.

The steep pitching ore bodies of the White Knob property are of immense size. They occur in contact with blue limestone and big porphyry dikes and have been continuous for 700 feet below the apex, showing their best values at the deepest point cut by a cross-cut tunnel where the earthy red oxides and green carbonates are, changing to blue and yellow sulphides. A new tunnel is now well under way which will tap the ore courses 1,600 feet from the surface, which, from present evidences, should be well within the sulphide zone and afford an important increase in copper values. The ores now being treated carry values of from two to five per cent. in copper and from \$1- to \$2 per ton in gold and silver. The Mackay Copper Belt is quite extensive and carries numerous very promising deposits.

Owing to the fact that lead mining is so much in fashion in the Coeur d'Alenes, a remarkably promising copper belt that traverses the mountains just east of Wallace and Mullen, has been neglected and warrants much more extensive development than it has so far received. The Snowstorm Mine, near Mullen, has been steadily producing quite a large tonnage of copper ore during the year, which is shipped to the coast smelters. This property is also installing an extensive leaching plant for treating its extensive reserves of surface carbonate ores.

The veins of this belt are great copper-bearing gossan iron-filled fissures, which can be traced for thousands of feet. They are on a par in size with some of the big lead veins and in several instances have been developed down to where the massive variegated sulphide ores are commencing to show. Other very likely copper properties occur along the tributaries of the North Fork and it is safe to predict that copper is destined to become an important factor in the total bullion output of this remarkably rich and varied mineral field.

The Seven Devils Range and Health Districts in Washington county contain some very extensive deposits of gold

and silver-bearing copper ore and a matting plant was quite successfully operated by the Ladd Metals Company during the first half of this year on their properties at Mineral on the Snake River. The same company is now erecting a sixty-ton plant at Landor in the heart of the Seven Devils copper district, where extensive reserves of ore have been developed.

The copper ore bodies of this range are often of immense size, ranging from fifty to one hundred feet thick. They generally occur at contact with limestone or slate and porphyry and carry average values of from three to five per cent. copper and pay streak values from two to ten feet wide, running from five to forty per cent. copper and always associated with gold and silver values amounting to several dollars per ton.

Lemhi County, in the east central part of the state, also has extensive copper resources which occur in a variety of formations in several different districts which are likely to form the basis of some very populous mining communities when transportation facilities are afforded.

The Blackbird District in this county has had considerable development and contains fully fifty patented claims and a great many still in the hands of the original locators that in many instances contain very flattering ore showings.

The ores in this district vary from a pay streak of rich ore, six inches to six feet wide to great impregnation zones of low grade ore one hundred feet or more wide. The surface croppings are brown oxidized gossan carrying a little gold and no copper, but usually at fifty feet deep under the surface change to sulphides. The big bodies run from two to five per cent. copper, and concentrate to excellent advantage. The concentrates carry a light percentage of cobalt and nickel and usually not less than twenty-five cents worth of gold to each unit of copper, but very little silver. The formation of this district is mica schist and granite.

At the Yellow Jacket District, fifteen miles west of Blackbird, the Steen Mine exposes a zone of concentrating copper sulphide ore in a shattered quartzose formation

which is seventy feet thick and carries three per cent. copper, and three dollars gold per ton together with a sprinkling of lead sulphide and fair silver values.

Some handsome copper prospects occur at Beaver and Indian Creeks and near the mouth of the North Fork of Salmon River which promise to develop large bodies of ore. They occur in slate and silicious schistose rock.

At Worthington Creek, south of Salmon City, the Klondike group of claims carries a large vein of gossan iron ore in greywack. There is very little development on this property, but it has thrown out a flow of float boulders amounting to fully one thousand tons and some of them several feet square, which all carry good copper values and some of them high grade red and black oxides.

The Bruce Mines at Spring Mountain District, near the southeastern corner of Lemhi county, are of the White Knob type and consist of immense bodies of copper gold-bearing hematite and magnetic iron ore in limestone and diorite. One shipment from this property besides ten per cent. copper, gave nine dollars in gold per ton. All the copper districts of Lemhi county are noted for intrusive dike rocks which range from rhyolite to basic hornblend diorite and at many points give definite evidence of permanency and large deposits of ore.

#### *Rare Metals.*

Idaho is noted for the occurrence of rare metals and minerals, and while this branch of our mining industry has not as yet gotten a start, the prospects for profitable mining in this line are good.

Monazite.—This mineral containing the valuable rare oxides of Thorium, Cerium, Didymium, etc., is very prevalently disseminated through the old placer gravel beds of Idaho Basin and in the Warren Basin. This mineral occurs as a yellow sand in about the same proportion as black magnetic iron sand occurs in most other diggings. It is derived from the disintegration of the granite formation and is also found in small quantities in the richer gold quartz veins that traverse these districts. Monazite is a very



heavy mineral, readily saved to a clean product by undercurrents and ordinary burlap tables. It has never been sampled very extensively, and whether a commercial proposition or not, has not yet been proved. The value of this mineral at present seems to depend on its thoria contents and ranges up to two hundred dollars per ton. Monazite has been reported from several other points in Idaho.

Molybdenum, Osmo-ridium.—At Deer and Platinum Creeks, fifteen miles east of Boise City, a San Francisco chemist has given a result of one-half an ounce of Osmo-ridium and one-fourth ounce of platinum from samples of rock taken from some great dikes of felsite or rhyolite in granite. These dikes are of great size, up to five hundred feet wide, and all carry low grade values in gold; one to three dollars per ton. The writer panned a number of samples of this rock, but failed to find any metallic particles of the rare metals mentioned. These same dikes, however, carry some fine specimens of flaky molybdenum, and one course ten feet wide gave an average sample of four per cent. of that mineral. Other investigations are being made in this field.

A blue-white, very heavy metal, in very fine particles hangs behind the fine gold pannings in the Salmon River placer bars near the mouth of Owl Creek in Lemhi County, and is thought to be platinum or iridium. The same is reported from the bars below the mouth of Little Salmon in Idaho County. The formations are gneiss and schists.

Cobalt and Nickel.—These metals occur in all the copper ores of the extensive Blackbird copper district in Lemhi County. The copper sulphide concentrates show cobalt nickel values ranging from two to ten per cent. Nickel values up to three per cent. occur with large bodies of gold-bearing iron pyrites in the eruptive granite formations of Washington Basin in Custer County. Similar values also occur associated with pyrrhotite and copper pyrite in metamorphic rocks at Profile Creek in Idaho County.

Tungsten.—This mineral occurs in large fissure veins of white quartz in a formation of diabase schists at Patterson Creek, Lemhi County, where some quite extensive develop-

ment work has been done and four per cent. average values are found three to ten feet wide.

**Tin-Vanadium.**—High grade stream tin ore carrying sixty-five per cent. metallic tin is found associated with gold bearing placer gravel at Panther Creek, Lemhi County, and in the neighborhood of Salmon City, also, in Lemhi County, from well defined fissure veins in granite. Samples containing thirteen per cent. tin associated with gold lead and vanadium are reported.

**Mercury.**—Pebbles of cinnabar that assay as high as eighty per cent. mercury are found in the clean-up boxes of the Stanley Basin placers in Custer County. At Sugar Creek, Thunder Mountain District, a shattered and cemented bed of quartzose sandstone contains average values of two per cent. mercury, and produces some fine specimens of ore. An extensive bed of volcanic tuff near Pine Grove, Elmore county, contains an average value of one pound of mercury per ton, and also some specimen cinnabar. Both the last mentioned points bear evidence of solfataric action. Native quicksilver has been reported at several points in Idaho.

**Opals and Corundum.**—Fire opals of fine gem quality have been mined in Latah, Owyhee and Lemhi Counties, in basalt and trachyte formations, and rough crystals of corundum occur associated with the placer gravels of Stanley Basin, Custer county, and along with placer bars of Lake Creek, Idaho County.

## The Mineral Resources of Maine.

BY LESLIE A. LEE, STATE GEOLOGIST.

The state of Maine has an area of 33,040 square miles. So numerous are the lakes and other bodies of water that the actual extent of the land surface is only about 29,000 square miles. While no mountain ranges now exist the occurrence of many isolated peaks and the much folded and disturbed condition of the rocks show that the state once possessed mountain scenery of the most magnificent kind. The greatest elevation is found in Mount Katahdin which has a height of 5,248 feet. The average elevation above the sea is considerable. This fact, taken together with the many lakes which serve as reservoirs for the abundant rainfall, gives to Maine a water power which far exceeds that of any other equal area in the United States. The Androscoggin River has a developed water power which is greater than that of any other river of our country. Undoubtedly the available water power of the state is its most valuable asset. The surface of Maine is well diversified into hill and valley. Above the rocky base the loose surface deposits are often of enormous thickness, partly filling the valleys and covering the more level areas. These superficial formations are almost wholly of glacial origin of the usual sorts. Many of them furnish road-building material of the best quality. Such is the hard unchangeable nature of the rock formations that few decomposed rocks are to be found in situ. When found these products of rock disintegration are also excellent for road construction.

Geologically speaking Maine is of extreme antiquity. Excepting the marine clays and sands of the glacial period no formation is of later age than the lower carboniferous and even these, about which there is some doubt, and those of the devonian age, are of relatively small extent. The greater portion by far are granites and allied rocks, gneisses, schists, slates and crystalline limestones. The schists, gneisses and slates have been variously assigned to the



Archaean and earlier Palaeozoic eras. The degree of general metamorphosis is so great in these that fossils are generally absent. The amount of uplift, folding and faulting is so much that it is difficult to determine the natural relations of the different bodies of rocks of entirely unlike character. The main areas of these rocks have been mapped with a considerable accuracy, but much remains to be done in the way of locating their exact boundaries. These coarsely crystalline strata are crossed by many huge veins of pegmatite and quartz, as well as by volcanic dikes filled with a variety of igneous rocks. The pegmatite carries a large number of interesting and valuable minerals, including many which have a marked degree of commercial importance, a description of which will be given on a later page.

Extensive areas of clay slates exist in the central and northern portions of the state. These are probably of Cambrian or Silurian age. Several small and widely scattered bodies of an impure Silurian limestone are found. These usually contain abundant fossils.

The principal Devonian rocks form a band extending through the northern part, nearly two hundred miles in length. Lastly, some small areas of sandstones and shales occur in the northeastern and southeastern parts, the age of which, as before stated, is still a matter of controversy, opinion being divided as to whether they belong to the upper Devonian or the lower Carboniferous.

The above brief sketch of the geology of Maine will show that within its boundaries are conditions extraordinarily favorable for the development of a great richness of mineral wealth. The expectation is indeed a reality. No reasonably complete list of its minerals has ever been published, though the writer now has one in preparation. Any extended research in a limited locality has usually resulted in the discovery of species not hitherto recorded from that place, and occasionally of something entirely new to science. The work of investigation is yet in its infancy, and promises much to the mineralogist.

An account of some of Maine's minerals and rocks of economic importance will prove of general interest.

Gold has a pretty general distribution in the state. While many of the river gravels will give a color, placer mining has been carried on only in the western counties, notably in the Swift, Dead and Sandy Rivers. The gold is of excellent quality, though fine, the largest nugget recorded having a value of about \$19. The gravels are worked in a small way and give a fair return for the labor expended. The search for the sources of these deposits has hitherto been unsuccessful, their origin still remaining a mystery. Many pegmatite and quartz veins elsewhere give a product of a few dollars per ton. None of the veins have been sufficiently exploited to demonstrate their real value, the anxiety for immediate returns causing them to be abandoned without proper development. A more liberal policy has been adopted by those who have recently entered upon gold mining here. Little of the ore is free-milling, though occasionally handsome specimens occur in grains and threads in quartz. Native silver has been sparingly found in connection with trap. Argentiferous galena is widely distributed, the largest deposits being seen in the southern and eastern parts of the state, usually in connection with volcanic rocks, the vein carrying also pyrite, copper, and some zinc. A few of the veins have been worked exclusively for the lead. Blue Hill, Sullivan, Cherryfield, Hampden, Lubec and Pembroke are the localities of the best known mines. The Mt. Gliner mine, in Milton Plantation, is developing considerable copper, with small values of gold and silver.

No iron mines are now worked, though there is much hematite and limonite in the state. The bog ore of the Katahdin Iron Works was operated for many years and the product is said to have been of exceptionally good quality. The cost of fuel and transportation caused the mine to become idle, but the amount of ore is well nigh inexhaustible.

Tin ore, cassiterite, is of sparing occurrence. At Winslow extensive operations were begun about twenty-five years ago, but the failure of immediate results caused their cessation.

Antimony has been found at several localities. The

best showings are perhaps at Carmel and South Portland. In neither place has any extensive work been undertaken.

Handsome specimens of molybdenite have long been known from Maine, and particularly those from Brunswick have enriched many cabinets of minerals. The increasing importance of molybdenum in the arts has directed attention to the deposits of this mineral. It is found in large quantities at Cooper, more occurring there than anywhere else in the world, it is reported. A company is now developing this property.

The non-metallic minerals of Maine possess even greater interest than the ores. Feldspar occurs in immense bodies in connection with the pegmatite veins. The principal localities where extensive mining has been carried on are Auburn, Edgecomb, Harpswell, Phippsburg and Topsham. The quarries at the latter place have been worked continuously for more than thirty years, and the product has been enormous. It is refined near the quarry and is shipped in that condition for manufacture into pottery and porcelain. Maine feldspar is of excellent quality and bears the best reputation. The Topsham deposit is almost pure feldspar, quartz being the principal accompanying mineral.

Quartz, "flint," is usually mined in veins of a very coarse pegmatite, the other components of which are feldspar and mica, both of commercial value. Where all are found together the question of the utilization of the three depends upon the facilities and cheapness of transportation. The best deposits and qualities of mica are found in the western counties. At present the largest production is at Roxbury. In Topsham plates of clear mica twelve and fourteen inches in diameter are found in connection with colorless quartz and large masses of feldspar.

Graphite is a mineral with which little has yet been done here. It occurs in numerous localities, occupying a belt fifty miles long in the western part of the state. Its abundance in masses and seams of remarkable purity leads to the expectation that its mining will prove a profitable enterprise. Madrid, Turner and Peru are places where it has been noted.



Garnet is found in such quantities as to offer inducements for mining for use as an abrasive.

Lepidolite, Amblygonite and Spodumene, though usually rare, may yet be mined for the production of lithium salts.

In the production of minerals used as precious stones, Maine stands in the front rank. Her gems have a world-wide reputation. For almost a hundred years they have been celebrated for their fine color, brilliancy and other good qualities. The yearly output is increasing, but has never yet been equal to the demand. Among the gems the tourmaline leads. Mt. Mica, in Paris, was the original locality where mining was begun in 1820, and still some of the finest stones are now being found. The mineral here occurs in pockets in a coarse granite formation. It is found in all colors and shades—green, red, pink, blue, yellow and white. The cut gems are of all weights up to 100 carats. One in the Field Columbian Museum is valued at \$10,000, while others still larger, as yet unvalued, are almost priceless, representing the largest and finest tourmalines in the world. It is said that tourmalines from Maine are unequaled anywhere else for their depth and brilliancy of color. Other localities celebrated for tourmalines are Auburn, Hebron and Newry. Of lesser note, but still of fine quality, are the gems found beryl, aquamarine, chrysoberyl, topaz, zircon and amethyst.

The rocks of Maine used for building, decoration and other industrial purposes, are too well known to require extended mention here. The quarrying of granite on a large scale began in 1836, and now this state leads in the value of its production. More than twenty distinct areas of granite are found well distributed over the state except in the northern portion. Probably more than one hundred quarries are now in active operation. Most of these of large production, are near tide water, where the facilities for transportation are best. Among the rocks which are commercially known as granite, are found those of every color and other qualities desired for building and ornamental purposes. They include gray, both light and dark, black, red and green, and

are unexcelled for durability. In many cases the size of the blocks taken out is limited only by the means used for handling them.

Roofing slate abounds in the central and northern parts of the state. The Brownville and Monson quarries have been worked for many years. This slate possesses most admirable qualities, and besides its use for roofing, is manufactured for many other purposes. The recent extension of the Fish River Railroad has opened up another area which promises to become of great value.

In the southern portion of the state are great beds of limestone, which have long been worked for the manufacture of lime, in Rockland, Rockport and Thomaston. At present the annual output of lime is nearly two million casks. Being shipped by water to most distant points, this enormous production is likely to be further increased.

This brief sketch will merely serve to show that Maine possesses a vast mineral wealth. Little of it has hitherto been utilized. Its development has been largely in the better settled portions. More than one-half of the state is still practically uninhabited, and consists of so-called wild lands, covered with forests. The mineral resources of this portion are little known. No one can foretell what proper exploration will bring to light. Yet there are innumerable present opportunities for the profitable investment of capital in the development of new mineral industrial enterprises. Water power is everywhere within reach either directly or by electrical transmission. Railways are extending into the wilderness and thus the cost of the manufacture and marketing of mineral products is reduced to the lowest terms. Maine may not contain bonanzas within her boundaries, but she offers a greater certainty of a liberal return on an investment than can be assured elsewhere.

Brunswick, Maine.











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